Telephony.

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Advertising and Telephone Numbers—Giving Employes Credit

Probably few telephone men in the United States have ever stopped to consider that many—if not most—American business firms do not put their telephone numbers in their advertisements. Classified advertisements of small size usually include this information, especially in daily newspapers, when the advertiser's identity is not disclosed; but the large displays in national weeklies and monthlies and in hundreds of other publications, seldem mention the telephone number.

This is strange, when you stop to think of it, for it would make it easy for prospective customers to reach the advertiser, The trouble is we haven't stopped to think about it. Telephony frankly admits overlooking this point until its attention was called to an article in the December issue of the Telegraph & Telephone Journal of London, which is published by the British Postoffice, in which surprise is expressed that American advertisers so seldom list their telephone numbers.

* * * *

Naturally, the British telephone staff make a close study of all that pertains to American telephone methods as they are trying to develop their national service—and they are succeeding. Looking at things from a long range people often perceive what others, who may be much closer, often overlook. Maybe this American failure to list telephone numbers in advertisements falls in this category.

Here is what the Telegraph & Telephone Journal says:

"Mr. Powell-Jones, of the Telephone Development Association, in the paper which he recently read before the Telephone & Telegraph Society of London, gently chaffed us because, as he said, advertisers in this, a telephone journal, did not always quote their telephone numbers. (As a matter of fact, most of our advertisers do quote them.)

"Mr. Powell-Jones has since discovered on analyzing the advertisements in the widely-read American journal, Telephony, that 72 out of 73 firms making display advertisements omit their telephone numbers. There must be some underlying reason for this at which we cannot even guess. We should have thought that in America the telephone number was almost an integral part of a man's address."

* * * *

There is small wonder why our English contemporary should be puzzled, inasmuch as American devotion to the telephone is constantly called to its attention. Come to think of it, it is queer that the invitation to telephone is so often omitted from the advertisements of firms seeking wider public contact.

Large concerns who advertise extensively, and their experts who plan their campaigns and prepare their copy, have what they consider good reasons for not listing their telephone numbers. One is that they are not seeking direct sales and only desire to popularize their product and help their jobbers and dealers. Another explanation is that in national campaigns where inquiries result, the bulk of such inquiries and the correspondence resulting is by mail. And again, for years the Bell companies opposed such practice. Lately they have advocated use of telephone numbers in advertisements and on stationery.

At the same time, in this age when long distance telephone service is in such general use, such reasons as these do not hold good as they may have originally. When telephone messages not only flash across the whole continent, but even between America and trans-Atlantic countries, transmitting important business orders and instructions, it would seem wise and business-like to include the telephone number, as well as the city address, in advertisements.

Telephony is of the opinion that the British journal has raised a good point in this day and age of rapidly growing telephone toll service around the whole world. Improved communication is bringing the various peoples closer together every day.

If a man in London knows the telephone number of a Chicago firm, they are nearer each other than they were before.

* * * *

In America it has become the custom with some business firms to say as little on their letter-heads as possible. Many omit their telephone numbers, and some even omit their street address. Their idea, apparently, is that it looks important and

dignified, and gives the impression that they are so big and well known that the mere words, "The Blank Corporation, New York" will bring them mail from every part of the world.

The United States Postoffice Department doesn't think much of this point of view, as it slows up delivery and adds to the work of the carriers, and the department is constantly urging the necessity of more complete addresses.

Probably everyone has looked in vain for a telephone number that belonged on a letter-head, and then been compelled to consult the telephone directory, meanwhile breathing a curse more or less mild on the heads of the firm that failed to list it on their stationery. The old alibi that the telephone number is not necessary, as most of the business is done by mail, is not valid any more; and, besides, most of those who offer such an alibi do not even give their street address.

By the way, does TELEPHONY's letter-head give its telephone number?

What, it doesn't?

Well, the next order for stationery will see that error corrected. How about the rest of you telephone men?

Praise for Employes

We hear much to the effect that we are living in a "machine age"—and probably too much, as overworking the idea tends to minimize the human in us and magnify the importance of large commercial operations. Remember the old saying "A corporation has no soul"? The great accomplishments of the organization as a mass are constantly emphasized, while the individual and his efforts and rights are often ignored.

In fact, it seems as though the alleged big business leaders valued only the achievement of mergers, and really believed that all that is needed to make progress is to be able to point to an imposing financial connection. It is, therefore, refreshing to find a man who thinks that the individual who is doing his work conscientiously is more important than a corporate name.

* * * *

In the New Year's greeting to the employes of the Home Telephone & Telegraph Co., of Fort Wayne, Ind., from President Frank E. Bohn, occur these four sentences:

"The telephone company has grown in size and usefulness most satisfactorily the past year. Its accomplishments and success are due entirely to the conscientious efforts and unstinted loyalty of the men and women in its employ. Its reputation is what they have made it, and, thanks to them, that reputation is a most enviable one. May it continue to grow in glory."

No doubt the success of the Fort Wayne company is largely due to the loyal and efficient cooperation of the men and women who compose its staff of employes, but it is equally certain that their work shows results because the officers of the organization are appreciative of their efforts and do not hesitate to say so.

The wise utility company executive knows that one effective way to win the good will of the general public is to get first the good will of his own company employes. In other words, the best campaign for "public relations" begins right in the home office.

* * * *

In making engineering calculations, engineers rely on the slide rule for quickly performing the multiplication and division operations—and sometimes the proper number of ciphers are not annexed to the final result, owing to misplacing the decimal point. This happened in making the calculations for the expenditure per hour made by the Bell system and published on page 14 of TELEPHONY of December 28. The error should have been caught in the check-up of the figures.

It was stated that expenditures for construction and improvements approximately totaled $690 per hour for 1929 and $800 an hour for 1930. These should be $69,000 an hour and $80,000 an hour respectively.

COMING CONVENTIONS.

South Dakota Telephone Association, Watertown, Hotel Lincoln, January 14, 15 and 16.

Arkansas Telephone Association, Little Rock, Gleason Hotel, January 20 and 21.

Minnesota Telephone Association, Minneapolis, Radisson Hotel, January 28, 29 and 30.

Nebraska Telephone Association, Omaha, Hotel Paxton, February 11, 12 and 13.

Oklahoma Utilities Association, Tulsa, Mayo Hotel, March 11, 12 and 13.

Texas Independent Telephone Association, Fort Worth, Texas Hotel, March 18, 19, 20 and 21.

Iowa Independent Telephone Association, Des Moines, Hotel Fort Des Moines, April 8, 9 and 10.

Ohio Independent Telephone Association, Columbus, Deshler-Wallick Hotel, April 15, 16 and 17.

Indiana Telephone Association, Indianapolis, Claypool Hotel, May 6, 7 and 8.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 13, 14 and 15.

Up-State Telephone Association of New York, Rochester, May 21, 22 and 23.

Company Bids for Constructive Ideas

Suggestion System Adopted by Lincoln Telephone & Telegraph Co. Brings Ideas of Incalculable Worth to Company and Cash Awards to Employes—Purposes of System—Explanation of Routine Followed in Testing Ideas Submitted

By C. W. Motter,

Publicity Director, Lincoln Telephone & Telegraph Co., Lincoln, Neb.

Four years ago the officials of the Lincoln Telephone & Telegraph Co. believed so thoroughly in the saying, "It pays to think while you are on the job," that they started out officially to prove it—to prove it to their 1,800 employes and to prove it to themselves. The medium of their proof was to be a suggestion plan which invited new and constructive ideas from the employes for the improvement of service.

The plan provided for supervision of the ideas submitted by a suggestion committee which now includes M. T. Caster, plant superintendent, as chairman; W. E. Bell, commercial superintendent, H. H. Wheeler, chief engineer, and Miss Flora Johnson, secretary. This system was put in practice in 1926.

The committee has full and final authority to determine all committee policies and awards; and the system is administered by a secretary, who handles these various duties in connection with her other work. Whenever the committee adopts a suggestion relating to any service or routine of the company, this adoption amounts to an executive order placing this routine or service into effect.

Hence, every employe is made to feel that he or she has a vital and equal part in the improving of the service, increasing the efficiency of the operation and advancing the interests of the company. Moreover, every suggestion that is adopted as having a practical value either from a service or personnel point of view is rewarded by a cash award. The minimum cash payment for an adopted idea is one dollar.

In addition there is a merit award of honorable mention in the company's house organ, "The Lincoln Telephone News," together with an article setting forth details of the suggestion and showing the employe's photograph.

First of all, let us see what the purpose of this suggestion system that is making a bid for employe ideas, is. This is best stated by quoting from an official bulletin prepared by the suggestion committee and sent to the field upon the inauguration of the system:

"In order to encourage new ideas and suggestions from employes for improving the service, increasing the efficiency of operation and advancing the interests of the company and its working forces, the Lincoln Telephone & Telegraph Co. has established a suggestion system.

The management wants all employes to feel such a personal interest in the telephone service that they will always be on the lookout for ways and means of improving operations in all departments—in the shops, at the switchboard, in the commercial offices, out on the line, and elsewhere. A great deal of study has been given to devising the most effective and practical way to get employes' ideas in circulation.

Through this suggestion system it is hoped we shall be able to use to our mutual advantage the practical experience, observation and wisdom of employes in all brances of the service. In an organization as big as ours, good ideas may come from any employe.

An operator or a member of a construction crew may have an excellent and original idea for getting new business, ideas for safety appliances, and methods, suggestions of more economical methods of using materials and supplies, ways of conserving them, and other practical means of reducing expenses. Members of commercial office forces with their unusual opportunities for contact with patrons, may develop brand new ideas for making our services attractive.

The field is without limit, and we know that a great many employes in the course of their day's work have just such things as these in mind.

Constructive suggestions concerning every phase of the company's operations are invited. For instance:

Improvements or changes in layouts, facilities, tools, methods and practices, which will tend to more efficient economical or easy operation.

Eliminating injury, waste, loss, damage, and delay.

Making the long distance service, monophones, extensions, public address systems, or other facilities more attractive to the public and to retain and increase their goodwill.

Suggestions concerning the company's public relations and how they may be improved."

Now then, let us observe how this system works. Let us suppose that Tom Gray, working as an installer in Beatrice, has evolved an idea which he believes may have a real public relations value to his organization.

What is the routine for the testing of his idea?

First, he will put his suggestion in writing on a blank form which is obtained from his supervisor. This form may also be used for any sketch or design as supporting detail for the suggestion. It is not compulsory, however, to use this form; any sheet of writing paper may be used.

He fully explains what his suggestion is and how it would work. In signing his name to the suggestion, he adds his loca-

"One of the Most Important Benefits of the Suggestion System," Says Mr. Motter, "Is the Fact That It Aids in the Stimulation of a Wide-Awake Progressive Spirit Throughout the Organization, Touching Both the Management and the Employes."

LINCOLN TELEPHONE AND TELEGRAPH COMPANY
LINCOLN, NEBRASKA.

SUGGESTION

(All suggestions subject to the rules of the Suggestion Comm)

Exchange_____

Date_____

I suggest that

FORM SS-1
Do not write in this space.

Sugg.#_____
Acknowledged

_____
Indexed as

Subject on

_____
Estimated Savings

_____
Recommended by
Plant Dept.
Recommended by
Traffic Dept.
Recommended by
Acc't.Dept.
Recommended by
Com'l Dept.
Total estimated cost of adoption of suggestion
Total estimate yearly saving
C A C 2
1
A
S B D
S

Recommended for:
Rejection
Adoption

Reason

_____

Signed_____
Date_____

Originator of suggestion advised of final disposition on

_____

Credited

_____
Department

Form Supplied Employes for Use in Submitting Suggestions.

SUGGESTION INDEX CARD

SUBJECT Mailing Pamphlets to Prospective Home Builders CARD NO.

Sugg. No	7-10-28 SUGGESTION	Adopted
505	Suggests that the pamphlets "Before You Build" and "The Modern House" be mailed to subscribers who are contemplating new homes, together with an individually typed letter on the subject of planning telephone needs before building.	

A. B. Waters,

Local Commercial Office,
Lincoln, Nebraska

Record Card Kept by Secretary on Every Suggestion.

tion, address, and his position with the company. If he finds his suggestion hard to put on paper, his immediate supervisor gives him confidential aid and communicates with the suggestion system committee on his behalf.

His suggestion written, he places it in an envelope and drops it in the "Suggestion Box"—a black metal box with a slot in the top, one of which is located in each of the 129 exchanges and the departments of the general office building in Lincoln. These suggestions are collected once a month by the manager or supervisor who mails them direct to the suggestion committee at the headquarters in Lincoln.

Members of Company Suggestion Committee, Left to Right: M. T. Caster, Plant Superintendent, Chairman; W. E. Bell, Commercial Superintendent; Miss Flora Johnston, Secretary, and H. H. Wheeler, Chief Engineer. Suggestions Are Reviewed by Committee and in Some Cases Passed on to the Superintendents of Departments Affected, Who Make a Careful Study of Them.

So the secretary receives Tom Gray's suggestion. She records it by number, reads it, makes a digest of the suggestion on the card for filing purposes and for later reference. This suggestion with the others received, are then classified as to subjects and held until the committee meets in regular conference. The suggestions are reviewed by the committee and in some cases passed to the superintendents of the departments affected, who make a careful study of the ideas.

Following the review of the suggestions, the superintendent in charge of the department concerned advises the committee of his views on the suggestion and his recommendation for its adoption or rejection. As soon as the suggestion committee can consider all available information on the idea, the chairman directs a letter to the employe making the suggestion, stating the acceptance or rejection of the idea as submitted. If the idea is accepted, he asks the auditor to prepare a voucher check for the award.

The letter to the employe also encourages him in a continued participation in the suggestion plan. A copy of the letter, together with all information regarding the suggestion, is forwarded to the secretary of the committee for filing.

Many times the employe is advised by a letter that the suggestion submitted is being kept alive, since it might be possible that changed or pending conditions may result in the acceptance of the suggestion.

If for any reason the employe is dissatisfied with the committee's disposal of his suggestion, he has the opportunity of appeal. Usually in such a case considerable additional investigation is made.

One of the most important benefits of the suggestion system is the fact that it aids in the stimulation of a wide-awake progressive spirit throughout the organization, touching both the management and the employes. Additional advantages may be summarized in the following manner:

1. An improved morale and stricter attention to working details.
2. A general betterment of working conditions.
3. The adoption of more efficient and economic routines.

During the first three years of operation of the suggestion system, there was altogether a total of 510 suggestions filed.

Approximately 212 different persons filed one or more suggestions. Of the number of employes who submitted suggestions, 60 were women. As to departments, 278 were related to the plant department, 60 to the commercial, 58 to the traffic, 15 to the engineering. Of the general suggestions 18 related to safety first.

Exchanges in South Carolina Merged Into One Company.

Sixteen telephone exchanges in South Carolina have been merged into one company, the South Carolina Continental Telephone Co., a subsidiary of the Continental Telephone Co. of Kansas City, Mo., according to an announcement by O. A. Knell, general manager of the South Carolina company with offices at Abbeville, S. C.

Mr. Knell stated that his organization now controls the plants at Sumter, Laurens, Woodruff, Fountain Inn, McCormick, Manning, Bishopville, Summerton, Kingstree, Lake City, Olanta, Conway, Lamar, Winnsboro, Walterboro and Abbeville.

Under the plan of organization the state will be divided into two districts. The headquarters of district No. 1 will be at Abbeville and that of district No. 2 will be at Sumter, under the direction of H. C. Tucker as district manager.

A program of improvement and extension was inaugurated several months ago and during the past year more than $100,000 have been expended in the rebuilding of plants in the state, and it is expected that twice that amount will be expended during this year. The organization has more than 125 people employed.

Employes Make Telephone Sales Quota Ahead of Time.

The employes' sales campaign of the Rochester Telephone Corp., Rochester, N. Y., reached its quota of 18,000 new telephones for 1929 more than a month ahead of schedule, William J. O'Hea, secretary of the corporation, announced early last month.

With the number of new telephones secured last year, the total number of telephones in the city is 85,489, Mr. O'Hea said, including towns in the vicinity of Rochester.

The employes' sales compaign began with a quota assigned to the various departments, excepting commercial, of 8,000 stations for the year. This was divided between the departments as follows: Accounting, 900; engineering, 900; plant, 4,000, and traffic, 2,200.

The business secured by the commercial department, including that offered at the business office, through the mail, and over the telephone, was to be considered as offered business, and a quota was set of 10,000 stations, making a total quota of 18,000 stations.

On November 30, 1929, with one month remaining of the campaign year, the quota of 18,000 stations had been reached. An interesting feature of the campaign was the fact that out of a total of 1,673 employes in the four departments participating in the canvassing, 1,105 or 66.1 per cent took an active part in the campaign.

Bell's Restaurant Business Aggregates 8½ Millions Yearly. .

The Bell system operates restaurants for the benefit of its employes in some of its larger exchanges, that do an aggregate business in excess of $8,500,000 a year.

Five hundred central office dining rooms are maintained for telephone workers, and 2,600 people are employed in these to prepare and serve some 30,000,000 meals a year, the average check running from 25 to 30 cents each.

Some of the food items for this business are $400,000 for bread and rolls, $336,000 for canned goods, $400,000 for fresh fruit and vegetables, $690,000 for fresh and smoked meat and $430,000 for ice cream.

In the smaller offices, where it would not be practicable to operate a restaurant, kitchenettes with gas and electric cooking apparatus and refrigerators are provided for the use of employes who may wish to heat food which they bring from their homes or prepare hot food, as they desire, without being obliged to go outside.

Electrolysis Surveys of Telephone Cable

Problem of Preventing Electrolysis Even More Important Now Than in Past Years Because Telephone Cables Are Being Placed Underground at a Greatly Increased Rate—Theoretical Considerations—Procedure of Making Survey

By Arthur L. Albert,

Assistant Professor of Electrical Engineering, Oregon State College, Corvallis, Ore.

The desire to prevent service interruptions and the high cost of such failures justify the expenditures of considerable time and money to prevent damage to underground telephone cables by electrolysis. This hazard is not new; in fact, it appeared shortly after telephone cables were first laid underground in about 1881.

Even though street railways and direct current power systems are not being extended very rapidly at present, the problem of preventing electroylsis is even more important now than in past years. This is because telephone cables are being placed underground at a greatly increased rate, and because many of these cables carry toll circuits which were formerly provided in open-wire leads. Not only are these toll cables much more costly to purchase and install, but also, long distance service interruptions are more important than failures in local service.

Although the actual replacement costs are usually paid by the company responsible for the damage, the desire to prevent service interruptions often causes telephone companies to make surveys of their underground plant independently of other utilities. In many organizations such surveys have been made for a number of years, and are now on a routine basis.

These surveys have been very helpful in locating areas in which electrolysis hazards existed, and in many instances have been the means of preventing costly failures and service interruptions. It is the purpose of this article to outline the general features of conducting an electrolysis survey, and to discuss the importance of such a study.

Theoretical Considerations.

The theory of electrolysis of underground cables by stray electric currents has been so thoroughly treated that it will only be necessary to briefly review the subject. An extensive list of material on electrolysis will be found in electrical engineering handbooks. Furthermore, while electrolysis may occur from any grounded direct current system, it is almost entirely from different current street railway networks and, therefore, only these will be considered.

Electric street railway systems are usually operated with the trolley wire positive and the rails negative, the potential difference being about 500 to 600 volts. The current accordingly flows out the trolley wire and back to the substation through the rails. It is common practice to install negative feeders, consisting of heavy conductors, at certain points in parallel with the rails to act as additional return paths.

Rail joints are carefully bonded together with low resistance conductors to keep the rail return resistance as low as possible. However, if the rails are small, if the rail bonds are in poor condition, or if the negative feeder system is inadequate, the return path to the substation will be of high resistance and there will be a tendency for the currents to seek additional return paths to the substations or to negative feeder points.

Currents will accordingly leave the rails and flow in the earth, and in underground pipes and cable sheaths, to the vicinity of substations or negative feeder taps where they will be discharged through earth. It is also common for currents to flow from rails to cable sheaths above a series of poor rail bonds, and to return to the rails at a point below the broken bonds.

Where the current enters the sheaths, harm is seldom done; however, where the current leaves, the cable sheath is decomposed in accordance with Faraday's law of electrolytic action. The rate of decomposition depends directly upon the current magnitude and the length of time this current flows. Points at which current is entering or leaving a cable sheath can be determined by measuring the potential of the cable sheath with respect to earth and to surrounding metallic objects.

According to the conventional theory, current flows from positive to negative. Thus, if a cable sheath is negative with respect to the street car rails, current is flowing from the rails to the cable; while if it is positive, the current flow is in the opposite direction and there is danger of damage.

If the rails are not accessible, measurements made from cable sheath to the manhole sump will show the conditions of the cable. A negative reading from sheath to sump indicates the cable is accumulating current, while a positive reading shows that the cable is discharging current. A typical case is shown in Fig. 1. The direction of current flow is indicated with arrows, and the voltmeter readings show the sign of the voltage at the point connected.

In making potential surveys a high resistance voltmeter of about 1,000 ohms per volt of deflection should be used. It is also desirable that the voltmeter has several ranges from about 0.01 to 100 volts, and that it is of the center zero type; that is, reads both positive and negative values. With such a voltmeter, and with connections made as in Fig. 1—with the positive terminal always on the cable sheath—it is never necessary to reverse connections or to change electrodes.

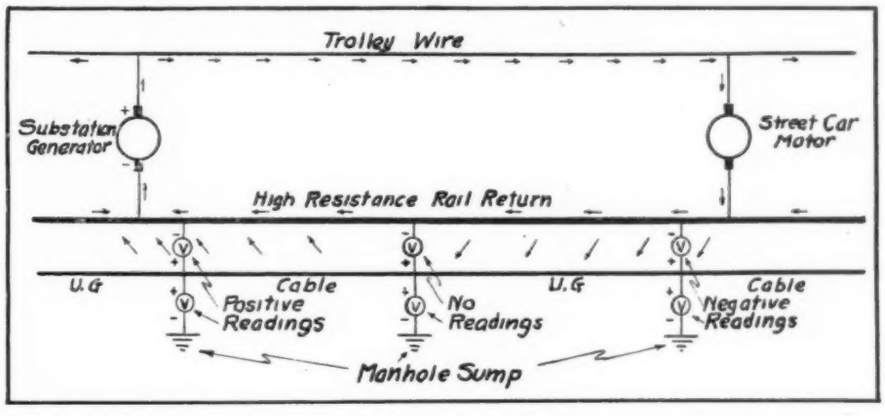


Fig. 1. Typical Case of Current Flow Between Cable Sheath and Car Rails.

A positive voltmeter reading indicates that current is being discharged, and a negative reading indicates current is being collected. A 24-hour, smoked-chart, recording voltmeter is very useful for checking doubtful areas and giving more detailed readings.

Making the Survey.

One of the first considerations in making the actual voltage measurements is the electrodes to be used. In designing these it is necessary to avoid the electromotive force which is generated whenever two dissimilar metals are immersed in an electrolyte. Thus, if both the positive and

negative voltmeter electrodes are of iron, and if the positive electrode is placed on the cable sheath and the negative one in the sump, there will be an error in the voltmeter reading due to the voltage generated between the lead cable sheath and the iron electrode in the sump.

In this case the moist earth acts as the electrolyte, and this is in contact with the cable sheath and not with the positive electrode. Consequently, the negative electrode in contact with earth should also be of lead. However, it is desirable to have the positive electrode made of iron to assist in obtaining good sheath contact. A satisfactory arrangement is shown in Fig. 2.

The rods themselves are made of bamboo, the positive one being about eight feet long and the negative about six feet. The ends of the bamboo rods are plugged with wood to prevent crushing, and the electrodes are mounted as shown. Wires from these electrodes can be placed in the center of the bamboo, but this is difficult and since the bamboo must be taped to prevent splitting, it is satisfactory to place the wires under this tape.

The positive electrode can be made from a piece of iron pipe; the teeth shown should not be large enough or sharp enough to damage the cable sheath. The negative electrode can be made from a piece of cable sheath, and the end should be carefully and solidly made or it will soon wear off.

The wire from the top of the rod for attaching to the voltmeter should be about 30 feet long for the positive electrode and 100 feet long for the negative. It should be a strong and flexible rubber-covered

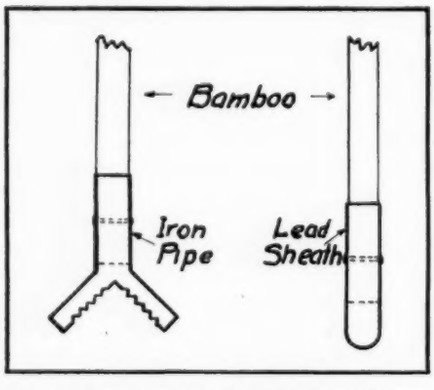


Fig. 2. Arrangement of Positive and Negative Electrodes Used in Making Voltage Measurements.

conductor which will not be damaged by automobile and truck traffic. Cleats can be fastened on the sides of the rods for holding the wire when not in use. A tripod or other stand for the voltmeter is desirable.

The measurements can easily be made by two men, except where street traffic is heavy, and can usually be made from the top of the manhole.

An accurate map, showing the location of all underground cables to be tested, is of great value. It is usually not necessary to take readings at every manhole, except where the cable plant and electric railway network are quite extensive. At each point voltage measurements should be made from cable sheath to rail, to sump, and to all other grounded metallic objects in the vicinity.

In addition to these, the millivolt drop along a section of the sheath should also be taken so that the direction and magnitude of the current can be obtained. It is generally sufficient to estimate the distance between the electrodes when these readings are made.

The actual current value in amperes is equal to the voltage drop in volts divided by the resistance in ohms, and the direction is from the positive to the negative contact. The resistance of the cable sheath can be computed or a sample sheath can be measured. A recording millivoltmeter can also be used to determine the current over a 24-hour period.

Interpretation of Measurements.

The voltages measured fluctuate rapidly and also vary somewhat with the day and time-of-day tests are made; therefore, care must be used to obtain reliable readings. Deflections must be observed for a period long enough to judge the average value.

It may appear that readings taken with an indicating voltmeter would not be reliable and would not compare with recording millivoltmeter measurements over a 24-hour period. However, a number of comparisons have shown that this is seldom true and only occurs when the readings are greatly different at different periods during the day; for instance, highly positive in the morning and negative in the evening.

Instances have occurred where cables have failed, apparently from electrolysis, in areas that repeated measurements, with both indicating and recording voltmeters, have shown to be apparently safe. That is, the cables were found to be negative with respect to earth, rails and other metallic objects. This has caused some doubt as to the value of a voltage survey. However, if careful records are kept and accurate tests are made whenever a failure does occur, it will be found that in most instances the damaged cable sheath is positive and thus discharging current.

Experience also shows that the magnitude of the voltage reading usually indicates the relative danger from electrolysis. However, a high positive reading does not always indicate a high current. A voltmeter reading indicates an IR drop, and this may be due to a high resistance and low current or low resistance and high current. The fact that the current is high or low can only be determined with an earth current meter.

If an electrolysis map is made after the survey is completed, it will greatly assist in studying the results of the survey. This map should show all electric railway tracks, substations, negative feeder taps and all underground telephone cables.

On such a map the voltages from cable sheath to manhole sump should be plotted to scale, using the cable as shown on the map as a reference point. Often red ink is used to indicate positive values and green ink for negative readings. These plotted points can be connected, and the areas included under the lines colored to correspond.

The direction of the current in the cable sheath can be shown by an arrow at the different test points on the map, and the magnitude of the current can be shown by the length of the arrow or by writing in the value.

In interpreting a result of a survey, highly negative areas should not be regarded as favorable. While these areas do indicate that the cable is accumulating current and is safe at that point, this current must be discharged at some other point, and at this latter location failures are likely to occur.

Changes in Officers of Radio Corp. of America.

Owen D. Young has resigned as chairman of the board of directors of the Radio Corp. of America, and becomes the chairman of the executive committee. General James G. Harbord has been elected chairman of the board, to succeed Mr. Young, and David Sarnoff, formerly executive vice-president, has been elected president of the company. Mr. Sarnoff is only 39 years old.

While no comments were made on behalf of the Radio corporation or its high officials regarding these changes, it is understood that the measures are in keeping with recent plans whereby the General Electric Co. and the Westinghouse Electric & Mfg. Co. will turn over their research and manufacturing activities in the radio amusement field to new subsidiaries of the Radio corporation, receiving minority stock interests in exchange.

Mr. Young, as chairman of the General Electric Co., henceforth will represent that company's financial holdings in the Radio corporation instead of its direct manufacturing interest, it is learned. General Electric and Westinghouse together own about 20 per cent of the outstanding common stock of the Radio corporation.

Automatic Exchange Installed for Prince of Wales.

An automatic switchboard for the Prince of Wales' private telephone exchange has just been installed in his London residence, York House.

The small wooden cabinet in which the exchange is housed, stands in a small basement room just underneath Sir Godfrey Thomas' apartment. Double doors open to reveal rows of selectors connected to the various points (at present 13) throughout the building.

Considering the Human Side of Work

Discussion of the Human Services the Average Telephone Company Renders to its Subscribers, Including Fire Protection, Companionship, Warnings of Disaster, Etc.—Paper Presented at Traffic Conference of Indiana Association

By E. L. Gaines,

Traffic Superintendent, Home Telephone & Telegraph Co., Fort Wayne, Ind.

An elderly widow living in a large eastern city decided to move to the suburbs. She purchased several acres of wooded land lying some distance from the main highway and several miles from the city. In a ravine on her land, she built a small cottage completely hidden from the roadway, and in this isolated spot took up her abode alone.

One of her friends living in the city became greatly concerned for her safety and insisted that she should have some one live with her, because of being in such a lonely place, and should have some means of protection. This friend was an elderly woman and very religious. One day in talking over the religious aspect of the situation, she remarked that, of course, she knew the Lord would take care of her but she thought she ought to get a good watch dog.

Later on someone asked the widow if she got a dog and she said: "No, I got a telephone instead. I thought it would give more protection and would be much more serviceable and companionable."

"Now," she added, "I am not alone in my cottage. I have all of my friends right there as close as the telephone. In addition, I have the grocer, the messenger, the doctor, the fireman and the policeman."

Burglars and thugs do not readily attack a residence in which they know a telephone is accessible for instant alarm.

This story leads me to my subject, which deals with the human services which we, as telephone people, are performing for our subscribers and the community at large. I want to include everyone connected with the telephone business in this group of telephone people, for all are necessary to the furnishing of telephone service.

Some may dig holes for poles, and others may repair equipment or clear line troubles. Still others may collect bills, while some solicit new business, or answer calls at the switchboard. All are necessary members of the big telephone family and have a vital part in furnishing service. The employes of the exchange serving a small town or village perform just as great, and sometimes greater, services than the average employes of the large city exchange.

There is a human side to every task, regardless of what that task may be. This is true of all work and is especially true of the telephone business. Our subject might be regarded from the standpoint of the employer, or we might look at the employe's side. For the purposes of this discussion however, let us look at it from the subscriber's viewpoint; considering the human services the average telephone company renders to its subscribers.

"There Is a Human Side to Every Task, Regardless of What That Task May Be," Says Mr. Gaines. "This Is True of All Work and Is Especially True of the Telephone Business."

First of all, let us consider fire protection. Before telephone service became so nearly universal, a fire alarm in a small town was usually spread by means of a bell or whistle. The same means was used almost universally in cities also. The alarm was effective after it was sounded; the difficulty lay in carrying the news of the fire to the point where the alarm device was located. Buildings burned down before messengers reached the place where the alarm could be sounded. This was especially true of rural communities and farms.

When a farm building caught on fire, it burned to the ground unless there happened to be sufficient man-power at hand to form a bucket brigade, which was sometimes effective in extinguishing the blaze. The old-fashioned dinner bell was frequently called into play to attract the attention of neighbors a half mile or more away. After the fire had gained sufficient headway to be seen by the neighbors, everyone for miles around gathered to witness the spectacle, for by the time they arrived there was little else to do.

The coming of the telephone has revolutionized fire alarm methods and greatly reduced fire losses. Most large cities today are well equipped with electric fire alarm systems having alarm boxes located at convenient places where alarms may be turned in. It is an undisputed fact, however, that in cities having good electric fire alarm systems the majority of all alarms are turned in over the telephone.

No city can hope to install as many fire alarm boxes as it has telephones. The telephone is so readily accessible to the average citizen and the telephone habit so strong, that when a fire occurs, he seldom thinks of a fire alarm box. Usually the alarm is turned in by telephone and firemen are well on their way to the fire before the one turning in the alarm would have had time to have reached an alarm box had he attempted to turn in the alarm through the electric fire alarm system.

In small towns, villages and rural communities the telephone is depended upon almost exclusively for reporting fires. The rural exchange operator frequently is burdened with the responsibility of calling volunteer firemen. Subscribers report the fire to the operator, and she in turn calls the firemen. Sometimes the central office equipment includes a switch by means of which the operator may turn on an audible alarm, such as a siren or whistle.

A rush of calls from people making inquiry regarding the location of the fire then makes it necessary to suspend all ordinary operating routines until the emergency has been met. The big point is that the emergency is met and disposed of. A building has been saved from destruction by fire and perhaps human lives have been saved from a horrible death. A telephone operator has worked speedily and accurately, and her work has accomplished much.

Rural inhabitants are no longer helpless when menaced by fire. A call to the city will bring speedy relief in the form of a fire truck or chemical outfit. A general ring on a rural party-line will bring instant response from neighbors who can give effective assistance.

The telephone is recognized today as one of the greatest sources of protection from fire.

It has been said that in early pioneer days, before the advent of the telephone, fear dwelt in the hearts of even the bravest of men; fear of sudden illness or accident, far from the aid of a physician. To ride a horse to death in an effort to reach a doctor in time to bring relief was not an uncommon occurrence in pioneer days. The physical and mental suffering occasioned by the lack of the telephone need not be dwelt upon.

The telephone has arrived, and with its arrival, days and hours of agony and suffering have been reduced to minutes and seconds. If one has ever used a telephone to summon aid in such an emergency, he realizes why the average subscriber does not want his telephone left out of repair over night.

When sudden illness occurs in the home, the telephone at the bedside is an invaluable source of aid. The mental satisfaction and sense of security given by having a telephone in the home is alone worth the total rental charge for the service.

The telephone today is the watchdog of the average home. It may be watching at the bedside in the home where misfortune in the form of illness or accident temporarily dwells. It may be watching over children who must of necessity be left alone for a time. Perhaps it is the sole source of protection for the loved ones in the home while the breadwinner of the household is away earning a livelihood for the family.

Here again we must speak of the value of the sense of security in the home and the mental satisfaction to the absent ones given by the knowledge that telephone communication is instantly available.

As a watch dog, the telephone is at its best when depended upon for protection against burglars, thugs, or anyone who might bring harm to the household. The average criminal intruder in the home will not enter a bedroom if he knows there is an extension telephone by the bedside. Newspaper accounts of how thieves and even intentional murderers have been foiled by means of the telephone are so common that they no longer attract a great deal of attention.

Isolated communities and homes are given almost the same degree of protection as cities and city dwellers, because of the smaller number of avenues of escape for the intruders once an alarm is sounded.

The telephone is one of the most effective aids in apprehending criminals that is available to the modern police force. All law enforcement officials would be handicapped in the performance of their duties if deprived of its use.

Warnings of impending disaster in the form of storms and floods have been given by telephone and, as a result, literally thousands of lives have been saved. The record of any storm or flood is seldom complete without an account of the good part played by the telephone and its effective use in transmitting advance warning of the impending danger.

The telephone operator usually plays a major part in all such affairs, and the annals of deeds of heroism performed by telephone operators who remained at dangerous posts of duty to warn others of danger are too long to recite. Medals have been given many such heroines and heroes, and praises have been sung of their valor. Some have even sacrificed their lives in order that they might save the lives of others.

All of us as telephone workers have cause to be proud of our chosen work because of the honor brought to us by our co-workers through their unselfish sacrifices. May these sacrifices be an inspiration to us to perform our various duties as members of the telephone organization in such a manner as not to detract from honors already conferred.

Human companionship is one of the greatest joys of mankind, yet from the earliest dawn of history it was largely out of reach of all those who lived on farms and in rural districts. Day in and out, sometimes for weeks at a time, the farmer and his family had no intercourse with the outside world. Human companionship outside of the family circle was almost unknown, excepting on the Sabbath when everyone assembled at the little rural churches or "went visiting" to the home of a neighbor, often miles away. The lonely life of the farmer's wife and family in the days before the rural telephone was almost as great as though isolated on a desert isle far from other human abode.

Of course, telephone service changes all this. If you don't believe it, just listen-in on a few rural lines in any small exchange and see if it sounds like anyone is lonesome. Someone commenting on a rural service inspection, said that all who were not talking were at their telephones listening-in. The radio may take the place of the great American rural pastime of listening-in on party lines only to a limited extent, for radio does not carry neighborhood news and gossip.

As telephone men and women we have perhaps been too severe in our criticisms of those who indulge in visiting and eavesdropping habits on rural lines. In spite of all the rules the telephone company may make to the contrary, most rural line subscribers always have considered, and always will consider it, their privilege and right to listen-in when they hear their neighbor's code ring on the line.

They are open and frank about the matter when talking with one another, and often when two are talking on a line, others on the same line or lines will join in the conversation. They all know one another; they are friends and neighbors, sometimes related as well, so why not be sociable?

After all, is not the human companionship brought to the farmer and made possible by the telephone, one of the most valuable service features we have to sell? If a subscriber rents a telephone for visiting purposes, should we object? If he insists on limiting its use to business calls, we charge him a higher rate for the service.

Those who live in rural districts are not the only ones to whom the telephone has brought human companionship. It has been said that the most lonesome place in the world is the large city. Telephone service brings human companionship to everyone regardless of location or condition. Perhaps no one knows better than the "shut-in" the real value of telephone service. Isolated from the outside world by accident, disease or deformity, the shut-in is enabled to be in as close touch with the world as many who are more fortunate physically.

When we attempt to sum up the value of the human services performed by the telephone and made possible by telephone organizations, we can not help feeling a just pride in the work in which we are engaged. The telephone operator naturally comes first for her share of the credit due for services performed, for she comes most closely in touch with the subscriber. Her voice is the instant touch with the outside world, always so readily accessible in emergencies.

But we must not give all of the credit to the operators. As stated before, everyone connected in any way with a telephone organization has a part in this worthwhile work.

A story is told of a repairman in a small magneto plant whose duties included the maintenance of the magneto switchboard. He had experienced difficulty with the night alarm because of dust collecting on the alarm contacts. He found that to be reliable these contacts required cleaning once each week. To clean these contacts was a tedious task and one which he was inclined to neglect.

One night one of his own family was suddenly stricken with serious illness. The repairman went to the telephone to call a physician. He rang for the operator and waited. He counted the seconds—10-15-20. Then he thought of the night alarm contacts. Would the alarm operate? The night operator slept most of each night, depending solely upon the alarm to waken her in case of an emergency call. Thirty-five seconds elapsed—and the operator an-

Secret of Persuasive Thinking.

To make others think as you want them to think, you must think as they think.

All the world is a store, and all the people in it are sales-people. That is to say, every one of us human beings is trying to transfer an idea from his own head into some other brain. And that is the essence of salesmanship.—Arthur Brisbane.

swered. Thereafter those contacts were cleaned regularly each week.

To give reliable service all employes of a telephone company must perform their duties promptly and faithfully. The least slacking up in the regular grind of daily routine will eventually reflect itself somewhere in the service. And as a rule it will show up first in some of these services which we have classed as human services. Service failures usually occur in emergencies—just when service is needed most.

Each and every telephone worker may well inquire into the quality of work he or she is doing.

Is it done with the painstaking care necessary to make the service a thing that can be relied upon in an emergency—when someone's life is in danger?

Is each call answered as promptly as it would be if it were known to be from some loved one who was in great peril?

Is the property maintained with the care that would be given it if your own life depended on the quality of your work?

We may well ask ourselves these questions and repeat them as often as we find our efforts to do our best becoming lax. Remember that at some time someone's life will depend upon the quality of your work; perhaps many lives. When the public so generally depends, to such an extent, upon our service for their safety and happiness, surely we should give the best there is in us not to betray the trust.

Every telephone worker should be proud of his vocation because of the valuable service to humanity he is rendering. Every call answered at the switchboard is saving steps, and many of them, for someone. Every day's work brings happiness, comfort and ease of both body and mind to a multitude of our fellow beings.

No work can be more worth-while than that which makes life easier and better for others, reduces hardships and brings happiness to many. The very fact that the public has such confidence in our service should make us proud of our work and painstaking in its performance.

We protect our subscribers and their property from fire, burglars and criminals, storm, flood, illness, accident and suffering. We bring together friends and neighbors, and visitors to the sick and lonely. And in addition to all these human services, we as telephone workers carry the bulk of the nation's daily business routine. Surely, no one can say our work is not worth-while.

Let us then exert every effort to make our service as nearly perfect as is humanly possible. Not that we may receive praises for our efforts, but that we may have the satisfaction of knowing that in earning our own livelihoods and in performing our own daily routine of work, we are doing more than merely providing for our own wants. we are at the same time making life more worth-while for our fellow men.

TRAFFIC GUIDES

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Long ago, before the white man ever came to this country, the Indians marked their trails. Unlike the markings today, theirs were invisible—hidden and known only to their own tribes. I used to enjoy reading Fennimore Cooper's stories, particularly those chapters in which he told of some stealthily crouching Indian tracing a trail. Sometimes he found it under the leaves on the ground; or maybe by the broken twigs on trees. And the Indian always took the signs seriously.

People depend greatly on road and warning guides when traveling in automobiles. Each one of these guides, of which there are many, tells its little story plainly and unmistakably, about what is ahead—short curves, narrow bridges, detours, cattle crossings, railroad crossings, school zones, etc., besides the regular road markings indicating routes. In some states there are little white crosses at certain places along the roadway where accidents resulting in loss of life have occurred. It seems too bad that some folks do not take these travel guides more seriously.

Even telephone calls are guided in their travels over the switchboard by certain markings. If they were not, there would be much confusion, delay, and dissatisfaction for customers.

I am thinking of Mrs. Jones. She is a subscriber on every switchboard in the United States. She is usually put on church committees and other activities because she seems to have more time than most folks. Every once in a while she is given a list of names of people to call by telephone. She first looks up the numbers in the directory and then proceeds to call them.

Everything runs along smoothly for the first few numbers. But here is one on which the operator says, after a very short pause, "Red 1342 has been changed to Red 916."

"Now, how did the operator know so quickly that Red 1342 had been changed to Red 916? She did not have time to look in the directory. She must have a good memory," thought Mrs. Jones.

No trick at all, we of the traffic department know; that is, most of us know. And so, for the benefit of those who may not know, this is what happened:

As the operator reached for the number, Red 1342, she observed her guides. The first guide was a small yellow quadrant at a particular corner of the jack 1342, specified for "red" party line stations. Upon seeing this quadrant she knew there was a change in her route to the desired party. So she looked up to her second guide, the "Changed Number Bulletin," and found the old number and the new number posted together.

As Mrs. Jones' list was rather long, and many changes had been made since the current directory was issued, the operator reported a number of changes to her.

"I wish I had that operator's memory," thought Mrs. Jones.

"Black 316, Central." And almost at once the operator reported, "I am sorry, Black 316 has been disconnected."

"She even knows those they don't have any more," thinks Mrs. Jones.

But with all due respect to the operator's good memory, this is what happened:

As she reached to plug into the 316 jack, she noted a red quadrant on the particular corner of the jack specified for Black party-line station designations. Red quadrants or guides mean "disconnected."

There are a number of other designation guides, but as the operator encounters the yellow and red ones the most frequently, especially as the directory gets older, I will not discuss the others.

I wonder if the origin of the expression, "Central, have you any more wrong numbers?" may have originated in towns where switchboards have no designation guides.

The Development of Rural Line Calls

Many Changes Have Been Made in Rural Class of Service—Field a Fertile One for Developing Line Call Business With Local Merchants—Some of Many Values to Business Man—Some of Other Uses for Rural Telephone Line Rings

By Clyde Kauffman,
Commercial Superintendent, American Telephone Co., Abilene, Kans.

Father Time is an active fellow, never found asleep, and continuously changing our ideas, customs and usages in many ways. We can recall the time when hearing the general line ring on the rural lines meant invariably the announcement of some calamity; some impending danger, or an emergency appeal to the community. The line rings of an alarming nature were not frequent in those days. In fact, little use was made of rural lines for information purposes.

Time, with its inevitable changes, has had a marked effect upon this class of our service. Today, when the rural subscriber hears the general line ring, he is interested but not necessarily startled. He anticipates news of special interest and value to his community; a bargain day special at Jones & Co., a public stock sale, a special community meeting; something or somebody lost, strayed or stolen, etc.

The news of an emergency nature is, of course, still handled but represents only a small percentage of the utility of the line calls.

The universal acceptance of radio broadcasting, both for entertainment and advertising purposes, has no doubt stimulated the use of rural telephone lines to broadcast news of general interest and information to rural districts. There is room for much further development of this service, the charge for which is quite nominal.

Possibly the most fertile field for developing line call business is with the local merchants. The method used by our company in introducing this service to them is shown in the following letter, which is mailed to the business men.

Dear Patron:

We are offering our business subscribers a definite service as outlined below:

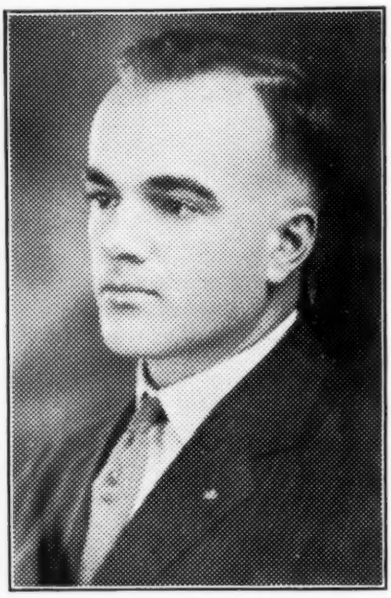
Saturday is recognized as the best marketing day in most agricultural districts and, therefore, the day for special sales. In view of this fact, we have designated a definite period between 6:00 and 7:00 o'clock Friday evening of each week for announcing your Saturday bargains over our rural lines. The standard rate for this service is 10 cents per line with a minimum charge of $1.00.

All our rural subscribers have been advised of this plan, and your message at this hour should reach them almost 100 per cent.

We believe you will find this means of advertising a very profitable one; and we will receive on Friday any message you wish to place over our rural lines. The messages will be announced in the order received. We shall be glad for a word from you as to the value of this class of advertising to your business.

Very truly yours,
(Signed by Local Manager.)

There is no question as to the value of this medium of advertising when properly handled. It rests with the telephone manager to supervise this work and arrange it so that the advertiser will appreciate its real value and experience the largest possible return from its use. For example, if solicitation of the business men resulted in securing six orders for line calls for a certain week, it would be better to divide them, using three each evening at the prescribed hour, rather than trying to crowd all of them into one evening.



"The Universal Acceptance of Radio Broadcasting," Says Mr. Kauffman, "Has no Doubt Stimulated the Use of Rural Telephone Lines to Broadcast News of General Interest and Information to Rural Districts."

Too many consecutive line ring messages may make of this plan a nuisance, and destroy its real advertising value. This danger must be carefully guarded against.

A few of the many values of this medium of advertising to the business man may be listed as:

The message goes directly to the person for whom it is intended.

The message reaches the best buyers in the rural trade territory—those with telephones.

The message is direct, important, and carries an appeal, brief but certain.

The message reaches the buyer at a time when he is reposed—evening meal time—and when all the household is present; they are planning their Saturday shopping trip, and the advertised bargain will go on their list for investigation.

The message reaches them on Friday evening just preceding Saturday, which is considered in most agricultural districts as market day or shopping day.

Solicitation of this service should be made at a time when road conditions permit easy access to market.

It is well also to consider the matter of cooperation with the local newspaper editor in this work. For example, if the editor will suggest to his merchant that he insert in his regular display ad the phrase, "Watch for our telephone line call Friday evening," by so doing he will be adding value to the merchant's space.

Results in selling this service require that one be on the alert for prospects, and then prove its value to them. It is sufficient to say that if this business is solicited consistently, it is not unreasonable to expect an average of at least two calls each week over all rural lines.

There are, of course, many other uses for the rural line rings other than merchandise advertising, such as: Advertising public sales, correcting dates and postponements of functions of public interest, for transient solicitors, for locating lost or stolen articles, stock, assisting police department in locating criminals, campaigning at election time by candidates, announcing special meetings, etc.

All employes may have a share in securing line call business, as this shows:

An operator at a certain exchange was asked by a farmer if a certain public sale would be postponed on account of bad roads. She reported this uncertainty to the farmer advertising the sale, and suggested a line call. He placed the call and thanked her.

Prices in the Metal Markets.

New York, January 6.—Copper—steady; electrolytic spot and futures, 18c. Tin—Barely steady; spot and nearby, $38.75; future, $39.17. Lead—Steady; spot New York, 6.25c; East St. Louis, 6.10c. Antimony—8.62c. Quicksilver—$124.

Getting in the Telephone Revenue

Accounts of Telephone Companies Divided Into Three Classes—Explanation of Each—Live, Final and Miscellaneous Accounts—Discussion of Effective Classification of Accounts—Treatment Necessary to Successful Collection

By Cary E. Drake,

Division Collection Supervisor, Southwestern Bell Telephone Co., St. Louis, Mo.

We in the commercial department hear considerable about collections. In fact, this is the most vital phase of our job. Simple enough when thought of casually, yet getting in the money really involves many points which warrant close consideration by those responsible for collection.

The accounts which a telephone company has may be roughly divided into live, final, and miscellaneous. Live accounts are regarded as those for telephone service, both pay station and regular. When a subscriber for this service leaves the city, or for some other reason has his telephone disconnected, his account is transferred to "final."

The telephone company does a great deal of work other than that of rendering direct telephone service. Rental of attachments, moving poles at the request of others, the leasing of wire, etc., are charged to subscribers on special bills, and the accounts termed "miscellaneous."

Each type of account must be handled independently. If the size of exchange warrants it, the collection personnel should be divided into the type of accounts involved, in order that the employe may better know the nature of the account which he is expected to collect. "Finals," for example, must be dealt with more speedily and perhaps more severely than live accounts; and one who handles special bills should have had considerable telephone experience and if possible some practical knowledge of what it is all about.

Even though our accounts are varied and require individual handling, there are well-recognized principles which may be applied to the whole for better collection results.

Most large department stores have a credit bureau which compiles information as to the paying habits of its credit patrons and has them classified accordingly. This should be done in our business also, for a telephone company certainly extends credit more liberally than most mercantile concerns. The classification should be reviewed monthly and changed as a subscriber's paying habits improve or decline in quality. This should be done cautiously, however, and in the meantime the classification adhered to assiduously. Otherwise, there would be no value derived from it.

An up-to-the-minute classification of accounts is an excellent basis for effective treatments. And in the treatments comes the climax of the story: They should be tactful but firm. Like any other business, we cannot run on hot air and sunshine. This should politely be made clear when the application is taken, when the account is closed, and as often in the meantime as circumstances require.

What has been called "educational treatment" has proved advantageous in many instances. This is a treatment given a poor-paying subscriber to whom we explain in detail (preferably by personal interview) the expense his delinquency causes, the obligation of a public utility to get in its earned revenue and the advantage to both himself and to us of his paying promptly.

The mode of treatment, whether by telephone, over the counter, letter or an "educational treatment" by personal interview is governed by circumstances. The idea is to keep down collection expense but at the same time not to sustain a loss by over-economy. Whatever kind of treatment is used, make it count. "Restricted repetition" is what our traffic friends would probably call it.

Prolonging settlement of an account usually results in its becoming more complicated and unpleasant to handle. People who owe us no money are our friends; but if they owe us money they dislike us, and the longer they owe us the more they hate us. Hence, moving up the date service is suspended to the 15th or even 12th of the month, where the outstanding is comparatively high, has been found to bring about desirable results. It is also well to make a cheerful adjustment where plant conditions support it.

Accurate up-to-the-minute classification and effective treatments are all there is to the successful collection of live accounts. More work is necessary, however, to collect a "final" account. If possible the entire amount outstanding should be collected at the time service is discontinued. Where this is impossible, however, additional strategy is necessary, especially where the subscriber moves to another town.

The up-to-the-minute classification will come in handy again here. This card file can be checked for "references," "former addresses," "firms where employed," etc. Interesting clues can often be found which will enable one to trace the whereabouts of the missing debtor.

Another way which has often proved effective in tracing former subscribers is to make use of the postal department's forwarding address records. Friendship with the postmaster will help the commercial employe a lot.

Incidentally, final accounts must be handled just as systematically as live accounts for the most profitable showing. In the smaller exchanges they should be treated at least three times a month at definite intervals.

A good way to keep the ball rolling where a single employe is not responsible for this phase of the work is to post the date for treating finals on the calendar pad for, say, the 7th, 14th and 21st of the month, and make sure that the employe handling all collections works the finals on these days.

More use should also be made of the facilities of other companies to locate and collect from debtors who have moved to cities in their territory. In the final analysis we are all in the same business and must work together toward the common end of making it pay.

In some places a measurement of the job has been taken by a rating table. In this table bogies are set for the various items of collection work. They are based on what is recognized as an average in obtaining good results. The bogies are, therefore, within the reach of every collection employe who is willing to work to

The Virtue of Helpfulness.

Helpfulness is a virtue well worth cultivating as it so often brings joy and happiness, peace and contentment, satisfaction and complacency not only to others, but to those who practice it. The knowledge that one has been helpful to another is bound to bring joy and satisfaction; and the greater the act and the larger the sacrifice, the fuller the measure thereof.

Many are the opportunities daily as we go through life to exhibit a spirit of helpfulness. Oftentimes a kindly word, a gracious smile or a friendly gesture are acts of helpfulness that may mean much to the recipient thereof. "Help thy brother's boat across and lo thine own has reached the shore." Let's all try to be helpful.—Frank E. Bohn, president, Home Telephone & Telegraph Co., Fort Wayne, Ind.

Announcement

"Telephony's" Annual Prize Article Contest

Telephone people are more interested than ever before in their work and in making telephone service more and more satisfactory and really indispensable to the public. How this is being done can only be told by the men and women engaged in the work.

"Telephony's" prize article contest offers special incentive to the many telephone workers to write articles concerning the practical phases of their work which may help others better to perform their daily tasks in the telephone field.

Many interesting, instructive, informative articles concerning plant, traffic, commercial and executive phases of the industry, have been published in "Telephony" in the past few years, but telephone work is ever-changing, and interesting discussions are always heard whenever telephone people gather together.

What would you talk about when meeting another engaged in your particular branch of work? Write down your thoughts, and submit them in "Telephony's" prize contest. The prizes are:

General or Executive Articles		Plant or Construction Articles		Traffic or Operating Articles		Commercial or Business Articles	
First prize	$75.00	First prize	$75.00	First prize	$75.00	First prize	$75.00
Second prize	45.00	Second prize	45.00	Second prize	45.00	Second prize	45.00
Third prize	30.00	Third prize	30.00	Third prize	30.00	Third prize	30.00

Articles submitted should be typewritten, on one side of sheet only, and double spaced. Photographs, pencil sketches or diagrams help to illustrate articles and make them more interesting. About 1,800 to 3,600 words are usually sufficient to tell the essential points and details of a story.

Articles which do not take prizes will be considered for publication in "Telephony" at the regular rates for contributions. More than one article may be submitted by a writer.

Contest closes March 24, 1930, and is open to telephone people only.

Stanley R Edwards
Editor

attain them. The weights assigned are based on the importance of the individual items. For example, the heaviest is for unpaid live accounts and the lightest for disconnects for non-payment. The total of the weights is 100.

Employes have often given as their reason for poor collection work a lack of knowledge of what they were doing as compared with the work of others. A rating table does much to dissipate this come-back and at the same time creates an incentive to improve.

The employe handling the job of collecting "miscellaneous accounts" should have a longer period of training and more specialized knowledge than one concerned with the live and finals. Other than that the same broad principles referred to may be applied to the collection of miscellaneous accounts. The main thing is to have a well-balanced job which when measured under the critical index of a rating table will produce 100 per cent.

Good Program for South Dakota's Annual Meeting.

The annual convention of the South Dakota Telephone Association will be held in Watertown, with headquarters at Hotel Lincoln, on January 14, 15 and 16. The first day will be given over to receiving reports of the officers and standing committees and President Grant E. Preston's annual address. The program for the second day has the following addresses scheduled:

"Furnishing Modern Telephone Service to a Small Community, at a Profit," by E. R. Stonaker, consulting traffic engineer, Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

"The Farm and the Telephone," by J. C. Crowley, Jr., secretary, Minnesota Telephone Assocation, St. Paul, Minn.

Address, by J. J. Murphy, member, South Dakota Railroad Commission.

"Planning in the Telephone Business," by Frank G. Hartzell, sales supervisor, Northwestern Bell Telephone Co., Omaha.

Address, by C. T. Bates, member, South Dakota State Highway Commission, Pierre.

Address, by C. C. Deering, secretary-treasurer, United States Independent Telephone Association, Des Moines, Iowa.

Demonstration of the Power Arc Follow-up, by K. A. Hoblet, outside plant supervisor, and G. A. Braun, transmission engineer, Northwestern Bell Telephone Co., Omaha, Neb.

Report of nominating committee.

The association's annual banquet and entertainment, followed by a dance, will round out Wednesday's excellent program.

On Thursday the reports of the auditing and resolutions committees will be made. The session will then resolve into a round table discussion of various topics in charge of H. M. Schumacher, secretary, Hanson County Telephone Co., Alexandria, and F. R. Irons, district manager, Central West Public Service Co., Chamberlain.

The program for this year's meeting is one of the best offered South Dakota telephone men, and Secretary-Treasurer Thos. Phalen expects a large attendance.

Good "Listener" as Girl Supervisor Gave Greatest Output.

Society has nothing to fear from industrial mechanization if it instructs the proper physiological, psychological and social researches, according to Professor Elton Mayo of Harvard, speaking before the American Statistical Association on December 30. Professor Mayo discussed the results of experiments with workers made by the Western Electric Co., Chicago, with six girl workers whose output under varying conditions was checked for 2½ years.

The results showed, he said, that the period of greatest output was the one in which the supervisor acted as a good "listener" in whom the girls could confide and to whom they could talk.

This led to a complete revision of the company's method of supervision and of its method of training supervisors. The company has now formulated a new plan of "interviewing" its 40,000 employes.

1930
MARKS
46
CONSECUTIVE YEARS
OF
MANUFACTURING
HIGHEST QUALITY
TELEPHONE APPARATUS
BY

THE NORTH
ELECTRIC MFG. CO.
GALION, OHIO

MANUFACTURERS
OF
MACHINE SWITCHING SYSTEMS

AUTOMANUAL SYSTEMS FOR CITIES
AUTOMATIC SYSTEMS FOR CITIES
REMOTE CONTROL SYSTEMS FOR SMALL EXCHANGES, C.B. OR MAGNETO
DIAL AUTOMATIC SYSTEMS FOR SMALL EXCHANGES, C.B. OR MAGNETO
AUTOMATIC P.B.X. AND PRIVATE EXCHANGE
TOLL SWITCHBOARDS, CORDLESS TYPE
POWER REMOTE CONTROL SYSTEMS
SIGNAL SYSTEMS AND CODE CALLS

When writing to the North Electric Mfg. Co., please mention TELEPHONY.

Millions to be Spent by Bell in Improving New York State Service.

Expenditures of approximately $120,000,000 during 1930 and $600,000,000 in five years, for telephone plant additions and improvements in its territory, are planned by the New York Telephone Co., according to an announcement made recently by President J. S. McCulloh. The total for 1930 will exceed by about $20,000,000 the expenditures for these purposes in 1929, the largest in the company's history up to this time. It represents a sixth of the nationwide total of $700,000,000 recently announced as the estimated cost of the Bell system's expansion program in the new year.

"Our studies throughout the company's territory, comprising New York state and a small part of western Connecticut, indicate that the growth in demand for both local and out-of-town service will continue to increase rapidly," Mr. McCulloh states. "Though large additions have been made continuously to the telephone plant in the past, a still larger construction program is necessary to care for the anticipated growth.

"In accordance with our usual practice, we have supplemented our budget for the year with a forecast of the construction requirements for the succeeding four years, with full regard not only to expansion but to such replacements and improvements in apparatus and equipment as will contribute to the speed and dependability of telephone operation and transmission. The prospective outlay of nearly $600,000,000 for these purposes during the longer period will exceed that of the past five years by more than $200,000,000.

By 1932 we expect to complete the major projects of a storm-proof cable program which will greatly extend and multiply the toll routes of the state and bring all but a very small percentage of telephones into connection with the improved toll system. For both exchange and toll line construction, about $35,000,000 will be expended in 1930 and $162,000,000 in five years.

Further extension of the dial method of operation will be made at many points. We expect that about two-thirds of the telephones served by this company will be on this basis, both in New York City and the state generally, by the end of 1934. This involves no reduction in the total number of operators employed. With the increasing size of the system and growing volume of traffic, they will still be needed for toll, long distance, information, and special services. The company's employed staff as a whole, already numbering 65,000, will necessarily grow larger to care for the increasing requirements."

Provision for subscribers' equipment is the largest general item of the budget, with about $32,000,000 indicated for 1930 and $186,000,000 for five years. This includes the various new instrumentalities for the improvement of service on the subscribers' premises, such as private branch exchanges of the dial type, telephone typewriters, and handset telephones. New York City's needs in subscribers' equipment are estimated at about $25,000,000 this year and $143,000,000 over the full period.

Another of the largest general items is the provision for central office equipment. About $30,000,000 will be expended for this purpose in 1930 and $164,000,000 in five years. Approximately two-thirds of each of these sums is for New York City, where the plans for the longer period include dial replacements of 33 manual switchboards now in service as well as the opening of a number of new dial offices and enlargement of others.

The estimated expenditures to enlarge housing accommodations for both operating and administrative purposes also are prominent in the construction program. Erection of new buildings or additions to others, together with land, call for more than $22,000,000 in 1930 and $74,000,000 in five years.

For central office equipment in the upstate area, comprising all that part of the state north of Westchester, Rockland and Putnam counties, approximately $5,000,000 will be applied this year and $26,000,000 in five years, according to the estimates. Substantial amounts are included for additional toll board equipment, an increase of about 70 per cent in the number of operators' positions at toll switchboards being estimated for the entire period.

By 1934, complete dial operation will have been effected in the cities of Buffalo, Albany, Troy, Schenectady, Glens Falls, Rome, Auburn, Binghamton, Elmira, Johnson City, Solvay and about 25 smaller localities.

For land, new buildings and additions in the upstate area, expenditures of approximately $8,800,000 are included in the five-year budget.

Carrying forward its program of toll system expansion and improvement, including several joint projects with the American Telephone & Telegraph Co., the New York Telephone Co. plans to expend an average of approximately $10,000,000 on this work during each of the next five years. The percentage of toll wire mileage enclosed in storm-proof cable will be largely increased and it is expected that by the end of this period more than 95 per cent of all the company's telephones will have this dependable cable connection with the general toll network.

Telephone Man and His Job.

Opportunity exists for everybody in the telephone business. There is a place for the man who hasn't a college education, and a place for the man who has.

The main thing for a telephone man to keep in mind is HIS JOB and the part it plays in realizing our ideals of world-wide service to humanity. This calls for putting forward every effort toward making a success of everything we do.

Maximum effort brings maximum results. The world doesn't owe anyone a living. You work for everything you get, and get the best from the things you work most for.—N. R. Powley, vice-president, Pacific Telephone & Telegraph Co.

"City Fathers" Discover Valuable Use for Classified Directory.

Ordinarily city officials look for revenue in the treasury or the dictionary, but the special license tax committee of the board of aldermen, St. Louis, Mo., have sought it in the telephone book.

The committee's duty is to find new sources of municipal income through license taxes. It wants to levy on all possible trades, services and professions not licensed already.

It seized on the telephone classified directory as the handiest list to consult, so one alderman read aloud the various headings from "A" to "D" and the chief deputy license collector told whether the particular businesses were taxed. Forty-one possible subjects of taxation were discovered. The alderman listed them and the associate city counselor who was present will consult the city charter to see if they are taxable.

The state law permits the city to license occupations and establishments that are listed in the charter, and the list is a long and varied one, with some broad classifications like "professions" and "merchants." Alderman Eilers, chairman of the committee, declared, "If we can't tax some of 'em, we'd better have the law changed so that we can."

In the "D's" the committee encountered circular distributors. "They're the ones who litter up our city," said one. "It's a fright. Tax 'em."

Many of the 41 potential revenue sources are establishments offering service of various sorts, rather than commodities or professional aid. Like a lot of the businesses already licensed, the majority of them likely would not be taxed a great deal individually, but the aggregate would make a nice showing in the city revenue, which never gets quite large enough to meet the expenditures.

Small Loss from Fire to Property Owner But—

When a small shanty on the outskirts of Michigan City, Ind., was burned, the loss was estimated at only $2; but the estimators failed to consider the fact that the flames had severed more than 50 pairs of cables belonging to the Indiana Bell Telephone Co. and that more than 1,000 telephones were put out of service for about 12 hours.

—Evidence Of rogress In The Philippines

THE remarkable strides which modern educational methods have made in the Philippine Islands, have attracted favorable comment throughout the world. No less remarkable has been the increase in material prosperity throughout the islands, and the resulting modernization of the larger cities.

Thoroughly in keeping with this progress has been the Philippine Islands Telephone and Telegraph Company's adoption of Strowger Automatic Dial telephone equipment. First installed in Manila in 1919, subsequent additions, necessitated by constantly increasing demands for service, have evidenced the high success with which Strowger Automatic Dial operation has met the operating conditions of that city. The Strowger Dial brings to these isolated islands the same swift, sure service which characterizes its action in the largest metropolitan centers.

Automatic Electric Inc.

Manufacturers of

STROWGER AUTOMATIC DIAL TELEPHONE AND SIGNALING SYSTEMS

Factory and General Offices: 1033 West Van Buren Street, Chicago, U. S. A.

Sales and Service Offices in All Principal Cities

GENERAL EXPORT DISTRIBUTORS

The Automatic Electric Company, Ltd., Chicago

In Canada . . . Independent Sales and Engineering Co., Ltd., Vancouver
In Australasia . . . Automatic Telephones, Ltd., Sydney
In Japan . . . Automatic Telephones Ltd. of Japan, Tokyo

ASSOCIATED COMPANIES

American Electric Company, Inc. . . . Chicago
International Automatic Telephone Co., Ltd., London
Automatic Telephone Manufacturing Co., Ltd., Liverpool
The New Antwerp Telephone and Electrical Works . . . . . Antwerp

AUTOMATIC SYSTEMS

When writing to Automatic Electric Inc., please mention TELEPHONY.

Here and There in Telephone Work

New Type of Television Developed by Westinghouse.

Television which can be viewed by a room full of spectators rather than by one or two was announced recently by Dr. Vladimir Zworykin, research engineer

Dr. Vladimir Zworykin, Westinghouse Electric & Mfg. Co. Research Engineer, Demonstrating His New Cathode Ray Television Set Which Can Entertain Large Groups Instead of One or Two Spectators. Miss Mildred Birt Is the Interested Watcher. The Broadcast Images Are Projected on a Mirror on the Top of the Cabinet, Making It Possible for Many to Watch.

of the Westinghouse Electric & Mfg. Co., to members of the Institute of Radio Engineers. The use of a cathode ray tube as a receiver gives this new type of television many advantages over the well-known scanning disk method of visual broadcasting.

The inventor is already in position to discuss the practical possibility of flashing the images on a motion picture screen so that large audiences can receive television broadcasts of important events immediately after a film of these is printed. These visual broadcasts would be synchronized with sound.

The cathode ray television receiver has no moving parts, making it more easily usable by the rank and file of the radio audience. It is quiet in operation, and synchronization of transmitter and receiver is accomplished easily, even when using a single radio channel.

Another advantage is that, using a fluorescent screen, the persistence of the eye's vision is aided and it is possible to reduce the number of pictures shown each second without noticeable flickering. This, in turn, allows a greater number of scanning lines and results in the picture being produced in greater detail without increasing the width of the radio channel.

The apparatus described by Dr. Zworykin is now being used in experimental form in the Westinghouse research laboratories in East Pittsburgh. A number of similar receivers are being constructed in order to give the set a thorough field test through station KDKA, Pittsburgh, which already is operating a daily television broadcast schedule with the scanning disk type of transmission.

The pictures formed by the cathode ray receiver are four by five inches in size. They can be made larger or brighter by increasing the voltage used in the receiver.

The transmitter of this new television apparatus consists of a motion picture projector rebuilt so that the film to be broadcast passes downward at a constant speed. This film is scanned horizontally by a tiny beam of light which, after passing through the film, is focussed as a stationary spot on a photo-electric cell. The scanning motion of the beam is produced by a vibrating mirror which deflects the light from one side of the film to the other.

Dr. Zworykin was forced to develop an entirely new type of cathode ray for his receiving apparatus which he calls a "kinescope." In this tube a pencil of electrons is bombarding a screen of fluorescent material. The pencil follows the movement of the scanning light beam in the transmitter while its intensity is regulated by the strength of the impulses received from the transmitter. The movement of the scanning beam, consequently of the cathode ray pencil, is so rapid that the eye receives a perfect impression of a continuous miniature motion picture.

A reflecting mirror mounted on the receiver permits the picture to be observed by a number of spectators.

This condensed description of the methods used by Dr. Zworykin to effect television transmission can give only an idea of the possibilities of the new system. To the radio public it means, when perfected, a means of television which will be simple to operate because it has no scanning disk or other moving mechanical part. The receiver will operate in silence, offering no interference to sound broadcasts.

To the radio engineer the invention is important for the same reasons and because it will not be wasteful of radio wave bands; this, because the transmitter and receiver can be synchronized using but one channel.

The name of Dr. Zworykin is not new to the radio public. Early last year he was brought into the limelight in connection with his facsimile transmitting device for telegraphing photographs, letters, drawings and documents.

Magneto Switchboard Repairman; Switchboard Trouble Analysis.

By JOHN A. BRACKEN.

Almost all electric troubles in the magneto telephone switchboard are due either to improper contact, including open circuits, short-circuits, and accidental grounds. The only notable exception are conductors that are too small or too large for the circuit of which they are a part or defective in design.

The term, "improper contact," includes contacts that are completely severed as well as those that are loose or dirty. Loose or dirty contacts cause high resistance. The amount of electric current flowing through a dirty contact will usually be considerably reduced, and if it is very dirty no current may flow at all. Further, dirty contacts generally will not be greatly affected by any vibration of the apparatus, while a

This Bottle-Like Object Is a Cathode Ray Tube Which Forms the Receiver of the New Type of Television Invented by Dr. Vladimir Zworykin, Westinghouse Electric & Mfg. Co. Research Engineer, Who Is Holding It. The Broadcast Pictures Appear on the Round End of the Tube and From There Are Projected on a Mirror in View of the Spectators.

loose contact is likely to be affected by vibration.

The term "contact" may be defined as the junction point between any two electrical conductors. By slightly stretching the meaning, it may be taken to also include a run-down dry cell or other kind

of cell; run-down because the electrolyte and the active material are, for various reasons, not in proper molecular contact. Short-circuit may also occur within the cell.

Improper contact and short-circuits cover nearly all troubles of an electrical nature in the magnetic switchboard; and this statement also holds for various other pieces of telephone equipment, and includes wrongly connected apparatus wiring.

From all this, it may be said that switchboard electrical troubles, such as dirty key and jack contacts, worn parts, worn insulation on cords, wiring, etc., are fundamentally not electrical troubles but are really mechanical faults.

After a study of natural sciences perhaps there is a good reason for believing that mechanical laws alone govern the phenomena of the universe. It has proved convenient, however, to group certain phenomena under arbitrary names. The behavior of water and liquids generally is covered by the word "hydraulics," the behavior of liquids and gases at different temperatures by the word "thermodynamics," while another branch of mechanical phenomena is grouped under the word "electricity."

Science informs us that electricity is produced by the flow of extremely tiny particles of matter called electrons, which undoubtedly is mechanical action. The more that is studied relative to this subject, the more we are led to believe that all phenomena is explainable on a mechanical basis and is governed by well-established mechanical laws.

Irrespective of the foregoing statement, it must be admitted that all magneto switchboard and other telephone equipment troubles manifested are the result of mechanical failures of one sort or another. This view is very important because it will aid the repairman in locating and clearing trouble.

In the process of analyzing switchboard troubles, the following three steps are involved; first, analyze each individual case as to symptoms, and probable causes; second, apply diagnostic tests to reveal the actual cause of the trouble; and third, determine the remedy which it will be necessary to apply in order to correct the fault. Fig. 1 illustrates a very simple method of analyzing a case of reported trouble by means of a chart and suitable tests.

In addition to possessing knowledge pertaining to the magneto switchboard apparatus and circuit arrangement, it is also very important that the exchange repairman be equipped with proper repair parts and tools for the purpose of making all necessary repairs.

The tool kit should contain such tools as a pair of extra long-nose oval pliers; a pair of oblique, or as commonly called, diagonal-cutting, pliers; a regular size screw driver, a small screw driver used for miscellaneous small screws, a switchboard cord plug screw driver; long, narrow-blade screw driver used for removing jacks, drops, etc.; socket wrenches fitting hexagonal nuts, combination socket wrenches and screw drivers used for adjusting residual screws of line and clearing-out drop armatures, combination flat wrenches used with hexagonal nuts unaccessible to socket wrenches, spring adjusters used for adjusting springs on jacks, keys, etc.; offset screw driver, switchboard cord plug gauge, switchboard line jack gauge, key spring contact and other contact burnisher, soldering copper, etc.

Nature of Complaint:—Subscriber Cannot Signal the Operator. | No. 1

SYMPTOM	PROBABLE CAUSE	DIAGNOSTIC TESTS	ACTUAL TROUBLE FOUND	REMEDY APPLIED TO CORRECT
Line Drop Fails to Operate.	Drop Out of Adjustment. Armature Stuck. Shutter Stuck. Winding Open, Short-Circuited or Grounded. Loose Connection or Wire Broken Off at Terminal. Line Jack Tip and Drop Contact Springs not Closed in Jack. Drop Winding Leads Broken Off at Jack. Dirty Contacts in Jack. Night Alarm Failure. Line Trouble. Magneto Generator in the Station Telephone Set Fails to Operate.	Test the Line Circuit from the Main Frame to the Switchboard. Test the Drop at the Winding Terminals. Test the Connections Between the Drop and Jack. Test Mechanical Adjustment of Drop. Test Adjustment of the Line Jack Contacts. Test the Line Circuit to the Station. Test the Station Telephone. Inspect All Wiring and Connections in the Switchboard Circuit.	Tip and Drop Contact Springs Not Making Contact in Line Jack No. 19.	Adjusted the Contact Springs Into Proper Alignment. Cleaned and Burnished Contacts.

RECEIVED: 12-12-29. TIME: 7:30 A. M.
CLEARED: 12-12-29. TIME: 7:45 A. M.
ELAPSED TIME: 15 Minutes.

REMARKS:

Fig. 1. Analysis Chart Covering a Single Case of Trouble.

Long Distance Telephone Call Saves Family from Flames.

A long distance call from Indianapolis, Ind., to Los Angeles, Calif., is credited with saving four lives. A friend in Indianapolis put in a call real early in the morning—forgetting the difference in time, two hours—to Major L. L. Muller at Los Angeles. Maj. Muller, his wife and two children were asleep.

When the call was put through, the major was awakened to find his home in flames. He rescued the family and turned in the alarm. He was burned on the hands and arms, but the telephone call saved his family and himself from a worse fate.

"Wonder Whys" of an Observing Traveling Telephone Engineer.

By Ray Blain.

I wonder why the majority fail to take advantage of the various types of clamps available for connecting two wires without twisting them together or soldering.

These clamps are generally called test connectors, for they were first used on toll and rural lines so that the circuit could be opened for test purposes.

They seemed to come into disfavor because occasionally a lineman would find a case of noise or open trouble in one. Marriage is not always such a howling success, but most people continue to marry at every opportunity. My point is: why condemn anything just because a few fail? There is not anything perfect, for even the new dials fail once in 80 million operations or something like that.

But seriously speaking, there are many places where a clamp of this type will prove a real advantage. One is where a drop wire is bridged on to another there is every opportunity that at some time it will be necessary to remove the bridge for test purposes. When this happens, it is very likely that the lineman will not have suitable tools or material with him to make a good connection, and a trouble report will remind him later of the fact.

If a test connector had been used, no doubt trouble would never have happened even though he did do a quick job of connecting. I doubt if trouble was ever caused on a test connector where the wire was thoroughly cleaned and the clamp tightened properly and thoroughly taped.

Where jumper wires connect to iron line wire at a cable terminal, it is a difficult task to make a good soldered connection; in fact, few are ever made. If they are soldered properly, there is every chance of the line wire being weakened from the heat so that it breaks later. A good test connector does the work much more quickly and in the majority of cases better.

I believe that all progressive telephone companies should adopt some good test connector and require its use on all work where necessity demands.

$10,000 Prize for Most Valuable Achievement in Science.

The largest single monetary award in America for scientific accomplishment has been created by Popular Science Monthly, which, beginning this autumn, will confer an annual prize of $10,000, accompanied by a gold medal, upon the American citizen who has been responsible, during the preceding year, for the achievement in science of greatest potential value to the world.

In making this announcement, O. B. Capen, president of the Popular Science Publishing Co., explained that the award was instituted with a dual purpose—to heighten the interest of the American people in those conquests of the laboratory and the workshop which benefit the entire community, and to focus attention upon the many scientific workers who, without thought of personal profit, toil to better man's control over his physical surroundings.

The award will be bestowed under the auspices of the Popular Science Institute, a research organization maintained by the magazine, of which Prof. Collins P. Bliss is director.

The prize will be conferred for the first time in September, 1930, and the initial period of scientific accomplishment to be considered by the committee of award will be the 12 months ending June 30, 1930.

Ordering Goods by Telephone Urged in Radio Talk.

Discussing retail salesmanship in a radio speech over the Columbia Broadcasting System last month, Dr. Julius Klein, assistant secretary of commerce, said that while there is a tendency in some quarters to consider the slogan "cash and carry" as embodying a money-saving principle, the benefits of the "telephone and delivery" system should not be overlooked.

"The telephone and delivery system," he said, "saves the time of thousands of customers, obviates the necessity of going to the store and enables the store clerks to operate effectively.

"A clerk with a dozen orders received over the telephone can stand in front of the canned peas and take down a dozen or more tins all at the same time, instead of making a dozen separate trips at the behest of individual customers standing in front of the counter.

"Such efficiency in assembling orders is one of the very effective means of cutting down troublesome and potentially destructive 'high transactions cost.'

"Business men are coming to realize more and more," Dr. Klein continued, "the enormous bearing that the question of 'transaction cost' has on retail efficiency. They are beginning to cast about for means to reduce the present high 'transaction costs,' which is so plainly an evidence of inefficiency and which is wrecking such havoc with their profits in all too many cases."

Christmas Window Exhibit in Sherman, Texas, With Electrically-Operated Santa Claus and Telephone for Use of Children.

Northern Texas Company Puts in Telephone for Santa Claus.

By C. A. Shock,
Vice-President and General Manager, Northern Texas Telephone Co., Sherman, Texas.

The Santa Claus pictured in the show window exhibit, seen in the accompanying illustration, was electrically operated, moving his eyebrows, lips and eyes, nodding his head and otherwise going through realistic motions that made him appear to be talking over the small telephone over his desk. An actual telephone was installed in the store entrance and connected with a booth in which an operator was sitting before a megaphone. Over 1,600 children talked to Santa during the five days the telephone was in operation.

The display was worked out by R. A. Johnston, Jr. of the advertising department of the Pool Mfg. Co., Sherman, and featured Pool's "Colortest" shirts. People from miles around Sherman brought their children to talk to Santa Claus over this telephone and to hear Santa reply over the loudspeaker.

The manager of the Pool Val-U-Plus Store in whose window this display was installed, stated that it was the best window attraction they had had in the history of their business and that in instance after instance it brought people into their store who had never before been in there.

The telephone proved to be one of the most effective parts of the display, for the children greatly enjoyed the opportunity of telling Santa Claus what they wanted for Christmas.

A Reduction in Long Distance Telephone Rates

An Advertisement of the
American Telephone and Telegraph Company

On January 1, 1930, there is effective a reduction in various long distance telephone rates in the Bell System which on the present volume of calls means a saving of more than $5,000,000 a year to the telephone-using public in the United States. This is the fourth reduction in long distance rates within a little more than three years. On October 1, 1926, they were reduced by $3,000,000. On December 1, 1927, a reduction of $1,500,000 went into effect. On February 1, 1929, there was a reduction of $5,000,000.

These reductions are in accordance with the aim of the Bell System to continue to furnish the best possible telephone service at the least cost to the public. Earnings must, of course, be sufficient to permit the best possible telephone service at all times and to provide a reasonable payment to stockholders with an adequate margin to insure financial safety. Earnings in excess of these requirements will either be spent for the enlargement and improvement of the service, or the rates for the service will be reduced. This is fundamental in the policy of the management.

New Equipment Adopted in Dundee, N.Y.

Important Points in History of Dundee Telephone & Telegraph Co., Dundee, N.Y., Which Was Organized in 1903—Capital Stock Doubled—Uniform System of Accounting Installed Along With Improvement of Central Office Equipment

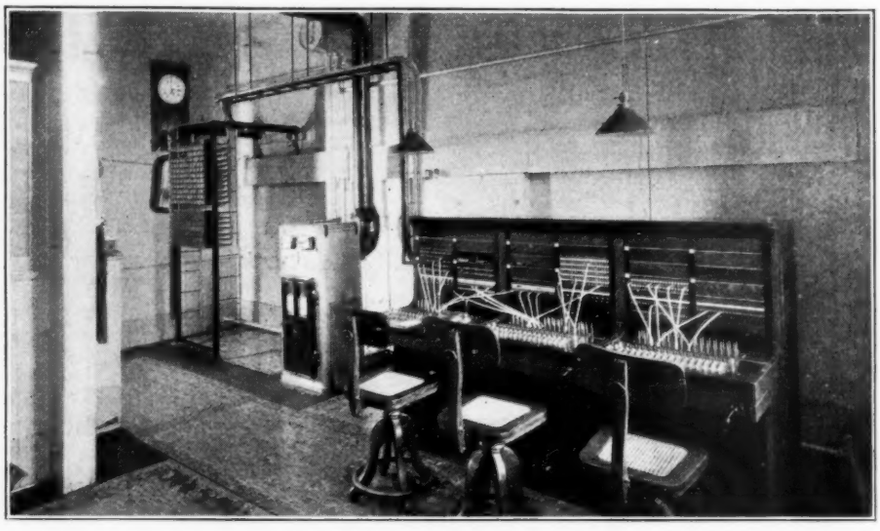
By John T. Barrett,
Sales Representative, Stromberg-Carlson Telephone Mfg. Co.

The Dundee Telephone & Telegraph Co. was incorporated June 6, 1903, under the laws of the state of New York for the purpose of conducting a telephone business in the village of Dundee, N. Y., and the surrounding community. The state papers also permitted the company to extend its lines to five other towns including Himrod, Starkey, Lakemont, Glenora and Rock Stream.

The forming of this company led to the organization of several other small firms, which were to supply telephone service to portions of adjoining communities not already taken up by the Dundee company, by constructing their lines to connect with the switchboard of that company for their exchange service. The villages included in this latter hookup were Wayne, Weston, Tyrone, Bradford and Altay.

The Dundee company was first organized with capital stock of $2,500 with a par value of $50 per share. All shares were sold to separate holders residing in Dundee and persons interested in the promotion of telephone service in that community.

Three years later the company was reorganized, and a large portion of the capital stock was taken over by President S. A. Price. This purchase gave him the controlling interest in the company and he held it until his death in 1917. At that time his son, Dr. A. J. Price, became president, and E. L. Sproul who had been with the company since its organization in 1903, became general manager. Mr. Sproul holds that position at present.



The New Stromberg-Carlson Central Energy Junior Multiple Switchboard and Equipment Installed at Dundee, N. Y., for the Dundee Telephone & Telegraph Co.

During the years between the birth of the company and its reorganization, the firm made tremendous strides at the time of the reorganization filed with the secretary of state a certificate of increased capital stock from $2,500 to $10,000, all of its stock being common. The company also grew in this period in plant construction and equipment as well as in the number of subscribers' stations.

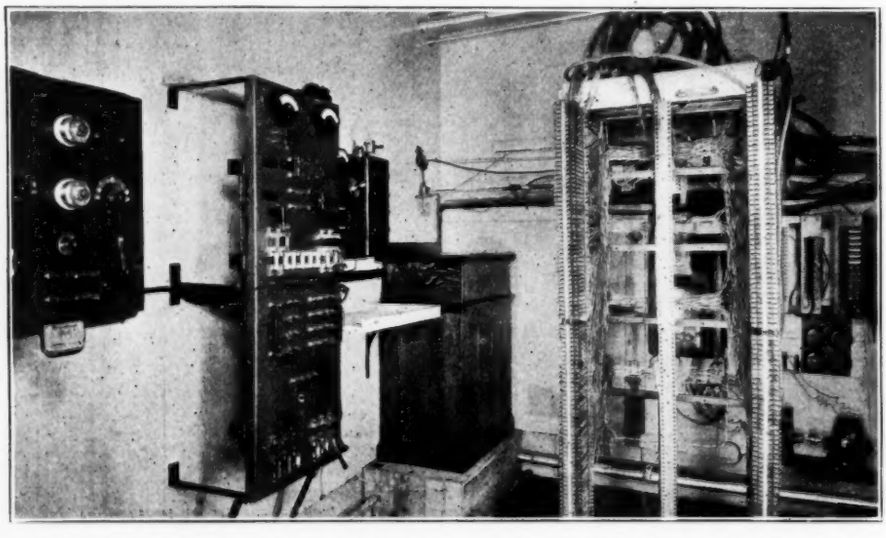
The company operated under this status until 1926, when another constructive program was undertaken. This consisted in the installation of a uniform system of accounting as prescribed by the public service commission.

During the years from 1906 to 1926, the company continued to increase its business by leaps and bounds, and in 1926, an inventory and appraisal were made of the property which resulted in the company's filing another certificate with the state, showing a capital stock of $50,000. During these years the outside plant and its equipment had received special attention in the way of better construction and improvement of the telephone service.

Along with the change in the accounting department the officials decided to change its type of central-office equipment to a modern type. The entire plant equipment, both local and rural, had been of the magneto type. After a thorough study of all types of switchboards and equipment, the officials decided to install a three-position, central energy, junior multiple switchboard, together with entire new central office equipment.

The company contracted for the equipment with Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., which installed it. The new equipment consists of 120 subscribers' lines, six toll lines and 44 rural lines, serving 750 subscribers. This makes it possible for everyone in the community to be in reach of good telephone service. All the old magneto equipment, which included 260 stations, was removed.

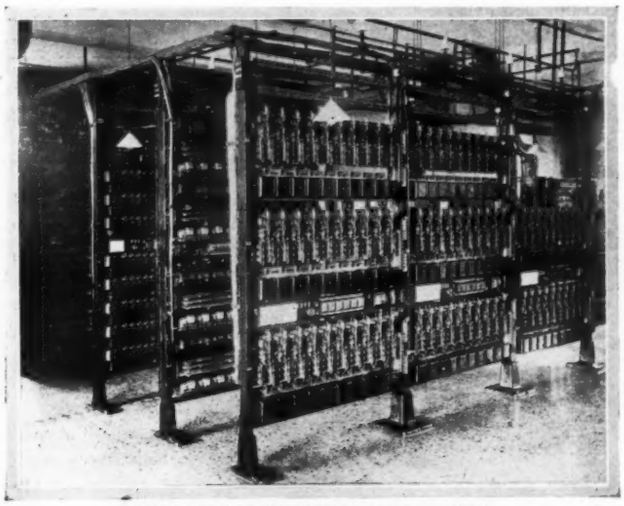
Although this change made it necessary for an increase in rates, the new system met with great favor with the subscribers.



The Power Board, Converter, Terminal and Ringing Apparatus at Dundee, N. Y.

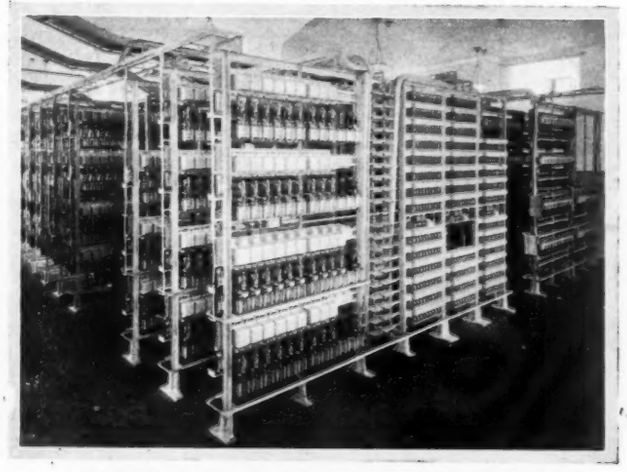
SIEMENS BROTHERS & CO., LTD.

SINGLE-SIDED RACKS
Sound Practice from the Start



GRIMSBY EXCHANGE, ordered 1913

VALPARAISO EXCHANGE, ordered 1918



ALBION EXCHANGE, BRISBANE, ordered 1924

SIEMENS

AUTOMATIC TELEPHONES

IN 1912, seventeen years ago, we commenced the manufacture of Automatic Telephone Equipment. We recognized that the methods of mounting the apparatus which were employed then and have been used until recently by our competitors were not the most satisfactory for economical use of floor space and for convenience in maintenance. We adopted, therefore, at that early date the single-sided rack system and have used it consistently in our own development ever since. So we have full reason to regard the interest now being taken in Single-Sided Racks with lively satisfaction! It is another proof of the soundness of our engineering practice.

We lead, not only in rack construction, but in all branches of the art. What we originate and recommend is recognized in the course of time as the only suitable basis for sound and lasting standard practice.

SIEMENS BROTHERS & CO., Ltd.
WOOLWICH, LONDON, S. E. 18

When writing to Siemens Bros. & Co., Ltd., please mention TELEPHONY.

Despite the increase in rates, the company secured a considerable number of new subscribers. The officers of the company feel well repaid for the time and money invested in their effort to make their plant an up-to-date one, for it enables them to furnish telephone service to their subscribers in a manner unsurpassed by many other exchanges of its size.

Stromberg-Carlson Junior Multiple Switchboard in Operation at Dundee, N. Y.

Toronto, Can., Claims the Lead in Telephone Density.

Toronto, with 200,000 telephones and four of every five families equipped, claims first place as a residence telephone city, according to information from the United States trade commissioner there, Harvey A. Sweetser.

The Bell Telephone Co. of Canada recently installed its 200,000th telephone and therewith presented the subscriber with a small plate, attached to the instrument, inscribed "This is the 200,000th telephone connected in Toronto, November, 1929."

A half-century ago the first telephone in Toronto was placed in the old Queen's Hotel; the new Royal York Hotel, on the identical site, now has 1,600 telephones to serve its guests and management. In the past 50 years there have been installed 200,000 instruments.

It was only in 1921, 42 years after the first installation, that the first 100,000 telephones were in use, and in a short eight years thereafter, this number was doubled, making Toronto one of the leading cities of the world as regards the prevalence of telephones. As a residence telephone city, first place is claimed, for four in every five families are equipped; 28 telephones to every 100 people.

There is an average of 1,500,000 telephone calls every day, and during the busiest hours 150,000 calls per hour are frequently handled. Most of these calls pass through underground conduits of which there are approximately 180 miles in the city.

Dividend and Interest Payments of Fort Wayne, Ind. Company.

On January 1 the Home Telephone & Telegraph Co., Fort Wayne, Ind., paid $102,500 to its stockholders and bondholders as interest and dividends on company securities amounting to $3,250,000.

This is the largest amount ever paid out by the company at one time and covers semi-annual payment of interest on preferred stock at the rate of 7 per cent, semi-annual dividends on common stock at the rate of 7 per cent and quarterly bond interest on Series A bonds at 6 per cent.

With the Manufacturers and Jobbers

New System Cut Into Service at Streator, Ill.

At noon on December 27, the Streator Telephone Co., Streator, Ill., cut over its exchange to automatic operation. The company serves 4,200 subscribers from a new building which was completed in September, of whom 845 are on rural lines

The Streator Daily Times-Press of December 27 carried a five-page telephone section telling about the new system and its operation. A description of the new building and equipment will be published in an early issue.

Progress of Automatic Telephones in Australia.

A cablegram from Australia is to the effect that the Central and Paddington automatic telephone exchanges have just been successfully opened for the public service at Brisbane. The event is notable because the transfer of these two exchanges, totaling nearly 10,000 lines, is the largest yet undertaken in Australia.

The conversion to the automatic system was commenced in 1925 when the South exchange with nearly 4,000 lines was opened. Since then the system has steadily grown until it now comprises three main automatic exchanges and seven satellite exchanges equipped for a total of over 20,000 lines.

All the automatic exchanges in Brisbane area have been manufactured and installed by Siemens Brothers & Co., Ltd., Woolwich, England.

The New Westinghouse Copper Oxide Battery Charger.

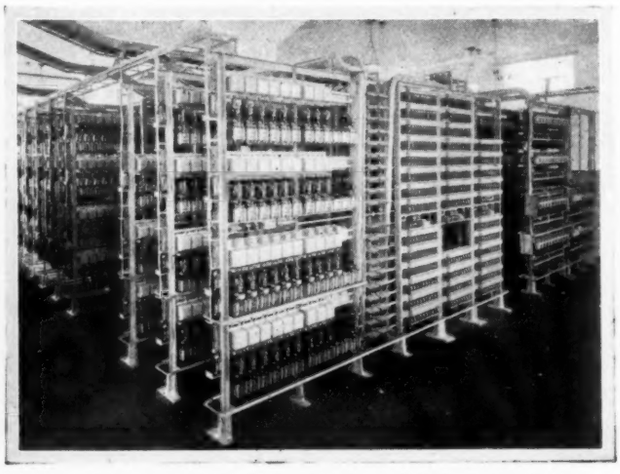
A new Rectox rectifier for charging batteries by means of copper oxide rectification is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Employing the copper oxide principle this charger, it is said, presents a simple, safe, and satisfactory means for charging storage batteries in all their applications.

The Rectox is easy to operate. It is necessary only to plug into any available lamp socket, attach the D. C. leads to the battery terminals and turn on the switch mounted on top of the charger. A few hours charging will put renewed life into the battery with no attention whatsoever.

Being light in weight, the Rectox can be moved to the battery easily. The trouble usually encountered in moving heavy batteries is eliminated. In automobiles the charger may be placed on the running board, making the connections with the battery left in place in the car.

The leading feature of the Rectox charger is the fact that there are no parts to wear out or replace, with the exception of fuses which protect both the alternating and direct current circuits. No chemicals or acids are used, and there is no danger of explosion or corroding fumes.

The rectifying unit consists of a long-life, dry-type rectifier, made from copper.



View of Albion Automatic Exchange, Brisbane, Australia.

"SPEAK LOUDER... I CAN'T HEAR YOU!"

Teletype puts an end to this annoyance

At last the difficulty of understanding telephone conversations because of noisy surroundings has been ended. Thanks to Teletype . . . the Telephone Typewriter . . . it now is possible to send *typewritten* messages over ordinary telephone circuits.

As an example of Teletype's usefulness, suppose you have a subscriber who is obliged to maintain communication between his office and a noisy plant. With a Teletype at either end he can exchange printed messages at the rate of 60 words per minute. Figures, hard-to-understand names and addresses, formulas, specifications . . . all will be recorded with absolute accuracy.

Teletype is the only device that sends typewriting by wire. Depressing a key on the sending machine causes both the sending and receiving machines to print that letter or figure . . . instantly! Errors in transmission are virtually impossible, as the sender has only to look at what he or she is typing in order to see what is being printed at the other end.

This is the Page Teletype, which prints its messages on the ordinary typewriter page.

Another advantage of Teletype is that it provides a record for filing at both ends. Thus it combines the speed and convenience of the telephone with the authority and permanency of the printed word.

Years of use by telephone and telegraph companies, railroads, press associations and industrial organizations have proved the efficiency and dependability of Teletype beyond question. It is extremely simple to operate . . . any typist can use it.

Join the hundreds of telephone companies that are providing their subscribers with Telephone Typewriter Service at excellent profit to themselves. The coupon below brings complete information . . . mail it *now!*

TELETYPE

THE TELEPHONE TYPEWRITER

MAIL FOR FURTHER FACTS

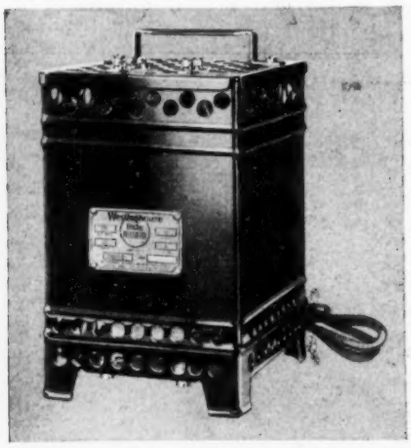
For full information concerning the Telephone Typewriter and its cost, sign this coupon, pin it to your letterhead and mail to the TELETYPE CORPORATION, 1400 Wrightwood Ave., Chicago.

*Name*_____

*Position*_____ T-1-11-30

When writing to the Teletype Corp., please mention TELEPHONY.

No bulb can burn out or become inoperative. The copper oxide principle of rectification takes advantage of the electrical properties of copper, coated with a layer of copper oxide. The unit formed in this way allows electric current to pass in one



The New Westinghouse Battery Charger.

direction only. Since there is no electrolytic or chemical action, the Rectox does not wear out.

The Westinghouse Rectox charger can be used in the home, in public garages, industrial plants, central stations, telephone offices and anywhere a storage battery needs charging. Radio set batteries and automobile batteries can be serviced by the Rectox.

Units Used in Telephone Transmission Engineering.

W. H. GRINSTED,
A. M. I. E. E., A. C. G. I.

The replacement some years ago of the "Mile of Standard Cable" by the "Transmission Unit" as the unit used for comparisons of the transmission efficiencies of different telephone circuits or apparatus has led to a somewhat chaotic state in the telephone world. A great many of the specifications referring to miles of standard cable are still in use, as well as a great deal of testing apparatus calibrated in this unit. Moreover, it will be remembered that the "Transmission Unit" was not acceptable to all administrations and on the European continent another telephone transmission unit, the "néper," is in general use.

Both these units are officially recognized by the C. C. I. (International Consultative Committee for Long Distance Communications), which has decided to adopt the name "Decibel" for the transmission unit. The "decibel" is one-tenth of a "bel." A similar sub-multiple of the "néper" is in use known as the "decinéper." Both the "bel" and the "néper" have the advantage over a "mile of standard cable" in that they can be defined fundamentally without reference to physical characteristics.

The definitions adopted by the C. C. I. are as follows:

1. If two powers P_1 and P_2 are concerned, the number of units is:

In the Naperian system (Népers).

$$\tfrac{1}{2} \log_e \frac{P_1}{P_2}$$

In the decimal system (Bels).

$$\log_{10} \frac{P_1}{P_2}$$

2. If two voltages V_1 and V_2 or two current I_1 and I_2 are concerned, the number of units is:

In the Naperian system (Népers).

$$\log_e \frac{V_1}{V_2} \text{ or } \log_e \frac{I_1}{I_2}$$

In the decimal system (Bels).

$$2 \log_{10} \frac{V_1}{V_2} \text{ or } 2 \log_{10} \frac{I_1}{I_2}$$

It has been common practice in the past in measuring crosstalk to define the amount of crosstalk by the ratio of the current in the circuit on which crosstalk is being observed to the current in the inducing circuit, adjustments being made for any difference in the impedance of the circuits. This ratio has been expressed as so many "millionths." Of recent years, however, the practice of expressing amounts of crosstalk in the units used for measuring transmission efficiencies—namely, the "néper" and the "decibel"—has grown.

In the present state of transition brought about by the introduction of these improved practices, some handy means of relating quantities expressed in one unit with corresponding values expressed in other units is badly needed. The relations can, of course. be shown as "curves" on a chart, but such a chart occupies considerable space and is somewhat cumbersome to use.

The scale reproduced on this page forms a much more compact and convenient means of making an approximate conversion from one unit to another. It has been issued in the form of a blotter by Siemens Brothers & Co., Ltd., London, to whom the writer is indebted for permission to publish this note.

It should be noted that the "Standard Mile" shown on the chart is the British standard mile in which allowance is made for the inductance of the standard cable, resulting in an attenuation constant of 0.106 néper instead of 0.109, which is the figure unit for the "800 cycle mile" in America. To convert to American 800-cycle miles, the readings in British standard miles have to be reduced by approximately 3 per cent.

"Telephony" Receives a Bouquet from Portugal.

Among TELEPHONY's foreign subscribers is the Anglo-Portuguese Telephone Company, Ltd. In a letter signed by Harry A. Hincks, manager at Oporto, Portugal, the writer has this to say:

"We would like to place on record our appreciation of the regularity with which your journal has reached us during a period of many years. Of the journal itself we would say—but, there, why attempt to paint a lily white?"

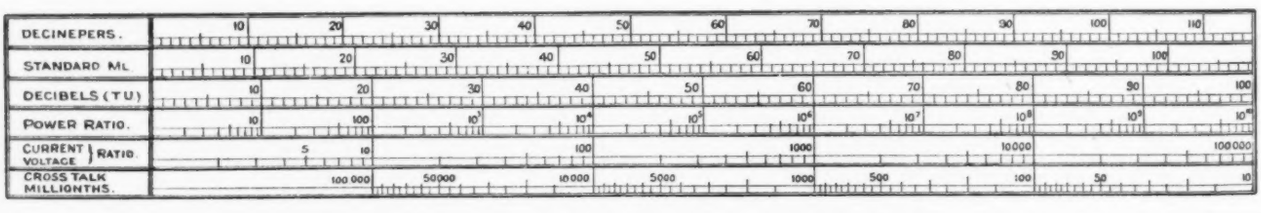
Western Electric and A. T. & T. Arrange for Dubilier Licenses.

A licensing agreement has been signed between the Western Electric Co. and the American Telephone & Telegraph Co. and the Dubilier Condenser Co. whereby the latter will receive a substantial cash payment and a royalty of 5 per cent on all future radio equipment sales of the Western Electric Co. and the Bell system and its subsidiaries.

The Western Electric Co. is obtaining a non-exclusive license on a number of Dubilier patents covering radio type condensers.

A SCALE GIVING THE RELATIONSHIP BETWEEN THE UNITS GENERALLY USED IN TELEPHONE ENGINEERING.

1 Neper = 8·686 Decibels = 9·420 Standard Miles
1 Decibel = 0·1151 Nepers = 1·084 Standard Miles
1 Standard Mile = 0·9221 Decibels = 0·1062 Nepers



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because they are

FAST-POWERFUL-ECONOMICAL

FWD Utility Trucks are made in 2 to 10 ton sizes . . . four wheel, six wheel trucks and tractor trucks. Send for copy of bulletin "FWD Trucks for Utility Service."

UTILITIES Companies the country over, use FWD Trucks in fleets because they are complete units . . . embodying speed . . . exceptional power and economy of operation.

In conjunction with FWD Engineers, sixty Utility engineers have developed FWD Trucks for this service . . . now they occupy an enviable position. They have sure-gripping traction and brake on all four wheels.

The FWD Utility Truck is equipped with American Telephone and Telegraph line construction body, winch, derrick and boring machine.

Write for the FWD Utility Truck bulletin.

The Four Wheel Drive Auto Co.,
Clintonville, Wisconsin

Canadian Factory, Kitchner, Ontario

FWD

BACKED BY NATION WIDE SERVICE

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Telegraph Chiefs to Testify in Couzens Bill Hearing.

Hearings were to be resumed by the Senate interstate commerce committee in Washington, D. C., on January 7 with the president of the Western Union Telegraph Co., Newcomb Carlton, on the stand, according to an oral statement on January 2 by the committee chairman, Senator Couzens.

Clarence Mackay, president of the Postal Telegraph-Cable Co., is scheduled to follow Mr. Carlton as a witness, Senator Couzens said. After Mr. Mackay the committee will hear Ellery W .Stone, president of the Kolster Radio Corp. and the Federal Telegraph Co.

The committee is taking testimony on the Couzens bill (S. 6) to create a federal commission to regulate interstate transmission of communications and power.

Oakland (Calif.) Files Action Against Increased Rates.

The city of Oakland, Calif., has filed a suit in the California Supreme Court seeking a writ of review of the California Railroad Commission's recent order raising rates of the Pacific Telephone & Telegraph Co. approximately $2,100,000 in the San Francisco and East Bay area.

The suit alleges that the railroad commission had no authority to raise the telephone rates and that no basis for the rate increase was offered in testimony.

The action followed refusal of the commission to grant a rehearing of the case on appeal of San Francisco, Oakland and other East Bay cities.

Increase Authorized for La Porte, Ind., in Majority Opinion.

Factional disagreement in the Indiana Public Service Commission was reflected again on December 27 in a split over the La Porte County Telephone Co. rate increase. Chairman John W. McCardle took an order completely out of the hands of the hearing commissioner, Frank T. Singleton, and rewrote it himself, authorizing an increase in rates.

The La Porte company has twice been refused temporary rate increases. Then it petitioned the commission to make the increases permanent and Chairman McCardle gave a majority approval with the aid of two other commissioners. As in the Terre Haute case, two commissioners put their approval on the order dictated by the chairman. Commissioner Singleton dissented and Commissioner McIntosh said he would write a dissenting opinion.

Notice that the city of La Porte, farm bureau federation of La Porte county and the La Porte Chamber of Commerce had filed an appeal from the rate increase order in the La Porte county circuit court, was served on the commission on December 31.

Terre Haute, Ind., Rate Case Taken Into Court by City.

The city of Terre Haute, Ind., has filed an injunction suit against the Indiana Public Service Commission in the Vigo county superior court, objecting to the recent rate increase order of the commission.

The court is asked to enjoin enforcement of the commission's order granting the increase and the city's complaint sets forth various reasons why it thinks the rates should not become effective.

The city contends that the commission allowed the company to include unused and unnecessary property in its total valuation; that the total valuation of $3,000,000 for rate purposes is too high; that excessive salaries are paid, and that the "going concern" or "good will" value is excessive.

Upholds Company's Discontinuance of Four-Party Service.

The Pennsylvania Public Service Commission, in a decision rendered last month, held that the discontinuance of the four-party message rate service was in the public interest, and tended toward betterment of the service in general, and dismissed the complaint of Louis G. Berling against the Bell Telephone Co. of Pa.

The complainant, Mr. Berling, residing in the borough of West View, has been a patron of the telephone company since February, 1926, when he subscribed for four-party residence message rate service at the rate of $2.25 per month for 40 local messages with a charge of 5 cents for each additional message. The service was rendered through the West View exchange until July 1, 1929, when the West View switchboard was replaced by a newly-constructed central office designated Wellington, which was not equipped for four-party message rate service and this particular service was discontinued in that area.

The majority of the subscribers to four-party service, including complainant, were transferred to two-party line service at the rate of $2.50 per month with the same number of local messages allowed. Mr. Berling was dissatisfied with the increased rate and asked that the service prior to July 1, 1929, which had been satisfactory to him, be restored

Mr. Berling averred that elimination of the four-party message rate service was contrary to a contract made by him with the telephone company at the time the service was taken. The company, however, showed that this so-called contract was the standard form of application for service.

The commission found that this form, as shown in the company's tariff on file with the commission, set forth that the applicant requested service and agreed to pay all tolls and other charges subject at all times to lawful rates and regulations.

The company showed that at every opportunity when changes in central office equipment became necessary, the four-party message rate service had been discontinued, so that gradually it was being reduced, with a view to its ultimate elimination to the satisfaction of the great majority of telephone users. Since 1925 the four-party message rate service had been steadily supplanted by the higher classes of service.

The commission found from the facts of record that the four-party message rate service produced greater revenue, considering the amount of plant required, but because of operating conditions and the installation of the modern operation by machine switching, its abandonment was necessary in the interest of better service demanded by the public.

The commission held that upon consideration of all the facts of record the action of the company in discontinuing the four-party message rate service in question was in the public interest, tending toward betterment of the service in general, and therefore dismissed the complaint.

Tri-State T. & T. Purchases Stock in Two Companies.

The Minnesota Railroad & Warehouse Commission recently granted two applications authorizing the Tri-State Telephone & Telegraph Co. to purchase a majority of the capital stock of the Nicollet County Telephone & Telegraph Co., St. Peter, and the Redwood Falls Electric Telephone Co.

The Nicollett County company operates exchanges in St. Peter, Kasota, Cleveland, Nicollet, Gibbon, Gaylord, Lafayette and New Sweden, with rural lines radiating from exchanges and toll lines inter-connecting them. The transfer of stock involved the sale of 7,062½ shares of stock by Roy F. Wilder, resident of St. Paul, to the Tri-State company.

The Redwood Falls Electric Telepho-

There's Science in Interference Trimming the right way—

THE BARTLETT WAY

Send a crew of Bartlett dendricians down one row of trees. Send another crew of ordinary tree trimmers down another row. In either case the costs will be approximately the same. In either case you will get wire clearance. But when the work is compared from the standpoint of intelligent preservation of the symmetry and appearance of the trees, the advantage is heavily on the side of the Bartlett Way. Because the Bartlett method is guided by scientific standards of practice, by an organization founded and developed on scientific ideals of accuracy and knowledge of tree life.

Where public good will plus effective clearance are dominant factors in your line clearance policy, the balance is all in favor of Bartlett.

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Public Utilities Division

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Good Service

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ALL dry batteries utilize a chemical solution which, operating between the zinc can and the chemical compound, generates the power. The life of a dry battery is determined by the length of time it retains the moisture of this solution.

STORM KING batteries have developed a new insulating material, more highly absorbent than any other, which will retain the chemical solution much longer than anything so far developed. The result is the longest service life ever developed in a telephone battery and this in turn means substantial savings to telephone companies in cutting down renewal costs to a new low point.

Manufactured by

GENERAL DRY BATTERIES, INC.

Cleveland, Ohio

Distributors:

A. J. Johnson Elec. Co., Chicago, Ill.
W. S. Nott Company, Minneapolis, Minn.
Suttle Equipment Co., Lawrenceville, Ill.

Co., Redwood Falls, will transfer 1,849 shares to the Tri-State company, the total outstanding shares being 2,000 in number.

Files Schedule for Automatic Private Exchange Service.

The Northwestern Bell Telephone Co. has filed an application with the Nebraska State Railway Commission for authority to offer private branch exchange service in connection with its dial switching systems, and to fix rates therefor. The rates will apply at all exchanges, but for the present will have application only at the Omaha exchange, where machine switching installation has been going on. The rates differ little from those for manual P.B.X. boards.

The application defines the Class E or dial systems, limits their permissible use, and prohibits their free use by the public. The rate will depend upon the capacity of the board rather than the number of lines in use. A paragraph specifies the manner of adjusting rates where there is more than one position involved. A more liberal use will be permitted in family hotel service, which includes clubs, hospitals and Y. M. C. and Y. W. C. associations.

Sale Authorized of Partially Competitive Nebraska Property.

The Nebraska State Railway Commission has granted, without a hearing, the joint application of the Lindsay Telephone Co., Ellen Sweeney, owner, and the Monroe Independent Telephone Co. by H. C. Bratt, district manager, for the sale of the former to the latter. The application disclosed that the Lindsay Telephone Co. is unincorporated, while the Monroe Independent Telephone Co. is an incorporated public utility and a part of the Nebraska Continental Telephone Co. group.

A portion of the telephone exchange property and system used and employed in giving service at Lindsay is owned by the Lindsay Telephone Co., the principal portion being located in the town. A portion of the town property is owned by the Monroe Telephone Co., but its principal development is rural. The remaining portion of the exchange property and system, consisting largely of central office equipment, is jointly-owned.

The Lindsay Telephone Co. has been serving 148 stations, mostly in the town, while the Monroe company serves 168 stations, largely rural. A written agreement has been entered into, by the terms of which the Monroe company buys all of the property of the Lindsay corporation, exclusive of the real estate occupied by the central exchange office. This sale includes all rights and franchises of every kind, and the Monroe company agrees to operate and maintain the property under the existing rates until lawfully changed.

The commission expresses the opinion, and so finds, that the consolidation is a step in the right direction and will be very beneficial to the patrons of both companies and the public. A condition, however, is attached, and that is that a 60-day notice of the consolidation, as required by the constitution where competing companies join properties, be given. At the end of that time, if no protests are received, the merger will become effective. Stockholders are given notice that if they have any objections they will be heard.

The commission said that while it is true that these companies do not have any paralleling lines in competition with each other, there is a certain element of competition which in the judgment of the commission would require the 60-day notice.

Physical Connection Between Toll Line and Exchange Ordered.

The North Carolina Corporation Commission recently authorized the Carolina Telephone & Telegraph Co. to effect a physical connection between its switchboard at Wilson and the line of the Fremont Telephone Co. when that line shall have been completed up to a point where physical connection with the switchboard at Wilson is possible.

On March 30, 1928, the Fremont Telephone Co. filed a petition in which it asked authority to construct a telephone line from its exchange at Fremont to Wilson along the highway between these two points, and an order requiring the Carolina Telephone & Telegraph Co. to connect that line with its exchange at Wilson for the purpose of transmitting toll messages for Wilson and beyond.

The petitioner based its request on two principal allegations: First, that the line thus constructed would furnish a local and rural service to those persons living along the proposed line who do not now enjoy telephone service of any kind; and, second, that the toll lines now in operation between Fremont and Wilson and between Fremont and Goldsboro were not adequate to meet the demands of the public using the Fremont exchange. The Fremont company also contended that it must have a substantial toll business if it was to prosper as a telephone company.

The Carolina Telephone & Telegraph Co., the respondent, contended that the present toll lines, connected into the Fremont exchange, furnished adequate facilities for the handling of existing business and any which might be expected to come from the new rural service extended to the surrounding territory. It further contended that it already had a circuit through the town of Fremont which the Fremont company had refused to permit to be connected to its Fremont switchboard. That circuit was now available, it said, and would be connected whenever the petitioner would grant permission to make the connection; and the circuit already connected, together with the one which respondent de-

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POSITIVELY NO RADIO INTERFERENCE

Very low current consumption.

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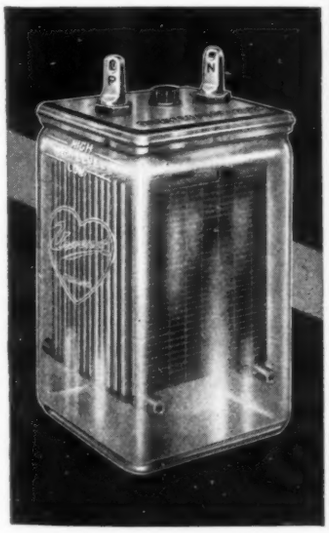

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THE FAVORITE Throws 600-foot beam (⅛ mile)

ALL PURPOSE WORK-LIGHT

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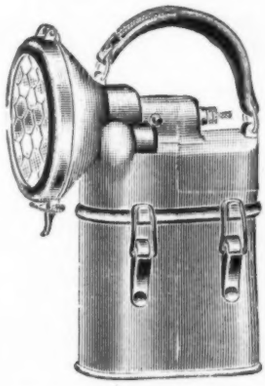
The EXCELLIGHT is always ready, safe, powerful, economical and simple. It is moisture and waterproof, which eliminates short circuits and greatly increases the life of the batteries. The EXCELLIGHT is indispensable, especially around places where inflammable materials are stored or manufactured.

With ordinary use the batteries will last for many months and can be replaced at small cost. Batteries are standard.



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Dept. L. Forestville, Conn.

A Complete Pole Service

Yellow Pine . . .

Full length pressure treated with Zinc Meta Arsenite. Plant at Augusta, Georgia.

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Western Red and Northern White "Butt Treated" by the open tank method with creosoted oil. Plants at Athens, Ohio, Spokane, Washington, and Minneapolis, Minn.

Chestnut . . . . .

Southern Chestnut "Butt Treated" by open tank method with creosote oil. Plants at Athens, Ohio, and Belington, West Virginia.

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Boston, Mass. .....80 Boylston St.
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The *Handyman* POLE PULLER

A ONE-MAN tool, light, easy to handle. Pulls a pole out of the ground three feet without taking extra hitch. Lifts on down stroke of the handle. Clamp prevents jack rubbing against pole, giving most direct possible pull. A most useful addition to plant equipment. Used on every job where heavy lifting is required.

Write for descriptive folder and prices.

HARRAH MFG. CO.

Bloomfield, Ind.

sired to connect, would furnish all the toll service required by the public using the lines of the Fremont company at Fremont.

The Carolina company contended that the rural service proposed by the Fremont company could be furnished by it without duplication of existing toll lines between Fremont and Wilson and without the connection at Wilson. The Carolina company, however, did not propose to furnish the local service, nor did it propose to prevent the Fremont company from furnishing it, but alleged that it stood ready and willing to make the additional connection of the toll line at Fremont and to furnish over it and the existing facilities all the service required by the petitioner for its Fremont subscribers.

On September 29, 1927, the Fremont company filed a petition asking authority to construct a toll circuit from Fremont to Goldsboro and another from Fremont to Wilson, the latter to be along the same highway as now proposed by the Fremont company for the toll line which it now asks authority to construct. In October, 1927, the commission granted the permission requested in the petition of September, 1927, and the Fremont company purchased the required material for the construction of the proposed toll line from Fremont to Wilson.

The Carolina company declined to connect with the petitioner at Wilson, and, failing to get the connection, the Fremont company filed its application in the present proceeding in which it again asked authority to construct the line to Wilson and petitioned the commission to require respondent to give a physical connection. It was not until this petition was filed that the Carolina company met the request of the Fremont company, repeatedly made, that toll lines or circuits, sufficient to meet its demands, be connected to the Fremont switchboard.

This connection was made in August or September of 1928 by the completion of an additional circuit between Wilson and Goldsboro through Fremont and filing with the petitioner a request to be permitted to make connection with its switchboard.

The evidence showed that the total business out of Fremont had increased gradually and substantially since 1924, in which year the total business out of Fremont amounted to $2,567.44, which had increased to $3,953.84 in 1928. The commission was of the opinion that this record of increase in business, together with the action of the respondent in tendering the petitioner an additional toll line at this time, constituted sufficient facts to warrant a finding that the public at Fremont required the additional toll service which the petitioner asked authority to furnish.

The commission found that the petitioner held authority to construct a line from Fremont to Wilson as granted by the order of October, 1927. Since that date the Carolina company had constructed a toll line from Wilson to Goldsboro and had requested permission of the Wilson company to connect such line with the switchboard at Fremont. Permission had not been granted by the Wilson company because, as a result of the order of October, 1927, it had purchased the necessary materials to construct the line from Fremont to Wilson and rested upon its rights granted by that order.

The line from Wilson to Goldsboro was in use, the commission found, and was needed for the other toll business of the Carolina company, although the toll business out of Fremont could be handled over it, and that upon these facts it seemed proper to stand by the order heretofore entered and to give to the petitioner the right to construct and furnish the service from Fremont to Wilson.

Having concluded that additional toll service was needed between Fremont and Wilson, the petitioner possessed authority from the commission to construct a line which would supply the service; that the respondent had need for its toll line now running through Fremont but not connected into the Fremont switchboard; that the respondent did not propose to supply the local service required between Fremont and Wilson, demand for which existed; and that the connection of the line at Wilson with the switchboard of the Carolina company would be of public interest, the commission was of the opinion that under the statute the exercise of its power of regulation by compelling a physical connection of the line with the exchange of the Carolina company at Wilson was justified.

Mr. Lee, chairman, dissenting, said: "It being admitted by the Fremont Telephone Co. that the purpose for which it is asking this connection is to take a business from the Carolina Telephone & Telegraph Co. that it now has and is in position to give to the public, I dissent from the order in this case. It is admitted, also, that the Carolina Telephone & Telegraph Co. has adequate circuits into Fremont, which, if it were allowed to connect with the exchange at Fremont, would be ample. To require the connection asked in this petition would, in my opinion, confuse rather than help public service; therefore, I cannot agree with the decision reached by the other members of the commission."

Summary of Commission Rulings and Schedule of Hearings.

ILLINOIS.

December 3: Order approved extending until June 8, 1930, period of suspension of the proposed rates for telephone service in Greenfield, Roodhouse and Whitehall, stated in rate schedules Ill. C. C. 4 of the Illinois Telephone Co.

December 11: Order approved authorizing Illinois Bell Telephone Co. to issue and sell $10,000,000 aggregate face amount of its demand notes bearing interest at 5½

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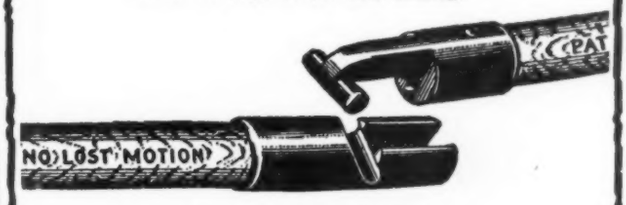

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December 17: Order approved authorizing the C. T. & N. Telephone Co. to increase exchange rates at Neoga, effective January 1, 1930.

INDIANA.

December 27: Increased rates granted the Winona Telephone Co. of Plymouth, for its exchanges at Leiter's Ford, Earl Park and Kentland.

December 27: Order approved increasing rates of La Porte County Telephone Co., La Porte.

January 8: Hearing on application of Northwestern Indiana Telephone Co. for increased rates at its Hobart exchange.

KANSAS.

December 30: Application granted of Central Telephone Co. of Grenola for permission to sell its plant and property at Grenola and vicinity to the Public Service Telephone Co.

December 30: Public Service Telephone Co. granted a certificate of convenience and authority to transact the business of a telephone utility at Grenola.

December 30: Application granted of Public Service Telephone Co. for permission to issue its capital stock in the amount of $7,000.

January 8: Hearing in matter of application of Spearville Telephone Co. for permission to discontinue its toll lines from Spearville to Ford.

January 17: Reopening of hearing in matter of the application of Ozark Township Telephone Co. of Colony in its application for a certificate of convenience and authority to transact the business of a public utility in Mount Ida.

February 13: Hearing in the matter of the application of the Leoti Chamber of Commerce, complainants, vs. the Leoti Telephone Co.

MINNESOTA.

December 31: Tri-State Telephone & Telegraph Co. authorized to purchase a majority of the common capital stock of the Redwood Falls Electric Telephone Co.

December 31: Tri-State Telephone & Telegraph Co. authorized to purchase a majority of the common capital stock of the Nicollet County Telephone & Telegraph Co., St. Peter.

January 4: Application dismissed, upon request of the petitioner, in the matter of the Northwestern Bell Telephone Co.'s petition for an order approving a schedule of rates for common battery service at Sauk Center.

January 13: Hearing at Green Isle in the matter of the petition of the village council of Green Isle for investigation regarding service in that village and the surrounding community, furnished by the Farmers & Merchants' Telephone Co.

MISSOURI.

December 18: Effective date of toll rate schedules between points served by Osage Valley Telephone Co. in Cedar, Hickory, Polk and St. Clair counties, extended to December 30.

December 19: Application filed by Municipal Utility Investment Co. to sell and Municipal Telephone & Utilities Co. to

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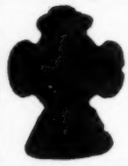
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purchase more than 10 per cent of the outstanding capital stock of the North Central Telephone Co., to wit—500 shares of common capital stock thereof—being all of the capital stock of the company issued and outstanding, together with other property, in consideration of the issuance to it of 5,000 shares of Class B common capital stock without par value of the Municipal Telephone & Utilities Co., and the sum of $5,000 in cash.

December 20: Hearing in the matter of Boss Brown, et al, vs. the Bosworth Telephone Co. and the Citizens Public Service Co. of Mo., continued to a date to be set by the commission.

December 20: Application granted of Creve Coeur Telephone Co. for approval of plan for improved service in territory served by it. The company is authorized to file its schedule of rates effective the first day of the calendar month after work of rebuilding and remodeling and making necessary changes to furnish common battery metallic line automatic or dial telephone service as applied for, is completed.

December 20: Application granted of Ozark Central Telephone Co. to sell and Southwestern Bell Telephone Co. to purchase certain telephone property.

December 27: Application filed by Concordia Telephone Co. of Concordia, Lafayette county, for an increase in rates. The petition of the company states it has modernized and standardized its service and it is unable to earn a fair return on the investment, plus cost of betterments; that last year it earned 6.39 per cent to cover return and depreciaton, which is inadequate.

NEBRASKA.

January 2: Application filed by Northwestern Bell Telephone Co. for approval of a schedule of rates for automatic or dial-operated private branch exchanges, and for clarification of various rules governing the use of service.

January 2: In the matter of the joint application of the Lindsay Telephone Co. and the Monroe Independent Telephone Co. for authority to merge their plants at Lindsay, ordered that the applications be granted subject to the publication of the 60-day notice required by the state constitution where competing utilities desire to consolidate.

January 3: Application filed by Hay Springs Telephone Co. for authority to publish and collect a joint-user rate as follows: Business, $1 per month; residence, 80 cents.

anuary 9: Hearing at Seward on application of the Lincoln Telephone & Telegraph Co. for authority to increase rates contingent upon installation of automatic equipment for central battery service and construction of new headquarters building.

NORTH DAKOTA.

December 27: Appeal dismissed of William Thiel for an order to compel the Northwestern Bell Telephone Co. to connect his farm near Rogers with the Valley City telephone exchange.

OKLAHOMA.

January 8: Hearing in the matter of the complaint of the Southwestern Bell Telephone Co. vs. J. F. Firestone, owner of Catoosa Telephone Co., alleging violation of commission order No. 912 and 1668.

SOUTH DAKOTA.

December 23: Dakota Central Telephone Co. authorized to establish a schedule of increased rates for service at Rockham.

December 23: Application granted of Dakota Central Telephone Co. for increase in rates at its exchange at Miller.

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